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ILLUSTRATIONS.

Eaton Hall, Chester (double-page Engraving).—Mr. Alfred Waterhouse, A.R.A., Architect.
Double-page Plan of Ground-floor of Eaton Hall, Chester.

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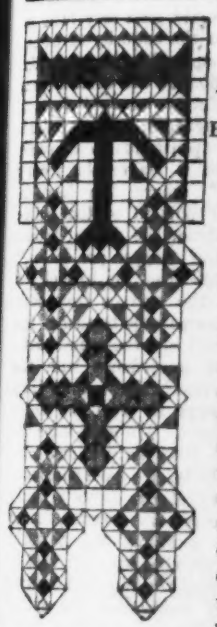


Warming and Ventilation.

*By a French Author.**

THE chapter in M. Planat's work which deals with hot-water heating at low pressure does not call for any special remark, except in regard to the "Chauffage Mixte," contrived by M. Grouville, and used at present only in one or two large hospitals in France. This is an arrangement whereby each floor or each set of rooms has a separate system of hot-water circulation from its own reservoir, but the whole of the hot-water reservoirs are heated by steam-pipes from one general boiler in the basement, which form a coil in each reservoir. The capability of steam to carry its heat for a considerable distance in pipes is thus utilised to bring a centre of heat to each floor, while the whole can be worked from one fire with the best economy of labour and fuel. The service of baths, &c., with hot-water, is fully illustrated. In the chapter treating of hot-water heating at high pressure, M. Gandillot's method of combining warming with ventilation in large apartments is worth mention. He forms the pipes into a coil at each corner of the room, in a chamber which draws in air from the exterior and passes it, warmed, up the centre of the coil into the room; around this chamber is an outer one, the space between the inner and outer coverings, which of course is more or less warm, communicating with openings in the floor or wainscot through which an *extract* current is formed. Thus the heat of the same coil of pipes is made both to draw in and warm fresh air and extract vitiated air. The contrivance is admirably compact and useful, if it really acts as theoretically intended. Unfortunately, that "if" is always suggesting itself in these matters. Warming by gas receives separate consideration, but we do not find any allusion to a method of applying gas where a gentle heat is required, just sufficient to take the chill off the temperature of an apartment, of which we certainly think something might be made,—that is, to employ gas in very small jets and with slow combustion to impart heat to fire-clay or terra-cotta. This use of gas was suggested a good while ago by a correspondent in our columns, and an instance of its employment cited. We have never ourselves witnessed any experiment with it. It has the advantage, or should have, of using the heat of gas in such a way as to produce the minimum of noxious result from combustion, at the expense, of course, of requiring a little time for the collection of heat in the fire-clay, and thus losing part of the special convenience of gas-warming,—its capability of instant application.

In concluding this part of the subject, M. Planat compares and sums up the advantages of various methods of warming. These must be regarded from various points of view: economy of construction and maintenance; power of assisting ventilation; uniformity of temperature when that is required; and power to change or regulate it easily according to circumstances. The most elementary form of warming is where the products of combustion, as in gas and fires, are merely turned out into the air of the apartment which is to be warmed. Gas has the great advantage of being instantaneously applied or cut off, and this is the one advantage it has; which operates largely, however, under certain circumstances. Open fireplaces are the least economical and the most feeble in result in comparison with the material consumed, of any; yet it may be said that there is no way of warming a room so agreeable, or more convenient, when it is a matter of consequence that each room should have its own independent source of warmth. And this independence is regarded as of much importance in Europe, though the author notes that in America there is an increasing favour shown towards schemes for general heating of a whole house, or even a group of houses. With all that can be said against the open fire, we do not believe any means of warming will ever be so agreeable or so generally liked. The open fire is like the chimney-pot hat; every one abuses it and yet no one likes to part with it. The open fireplace has also the advantage of furnishing a strong ventilating current, which, however, is very unequal unless the fire is constantly attended to and kept at about the same point, and is sometimes even an inconvenience in producing draughts, which draughts, from the position of the fireplace, usually pass along the floor exactly where one wishes it to be warm (an inconvenience we are practically experiencing at the moment of writing this with the back to an open fire), while the really warm air of the room is all at the top. In fact, there is no doubt the open fire is an uncivilised relic of barbarous and pre-scientific times; but, like some other relics of barbarism, it is undeniably picturesque.

Stoves, the author considers, are, when furnished with no special supply of ventilation, very economical and very unhealthy. Their special economy being to burn slowly, they, on that very account, do little to make a ventilation, as a fire does, and should always have a special "*prise d'air*" provided. We do not even agree with M. Planat in saying that it is only in very large public halls that stoves without a special air-supply should be tolerated. However large a public hall may be when full of people, it requires special air-supply as much as, or more than, any other kind of building, and every means possible for keeping the air in a state of flow should be provided. Let any one who doubts this go and sit, for instance, in the balcony at St. James's Hall on a full "Monday Popular" night, and experience the kind of atmosphere in which we are condemned to sit on such occasions in what passes for a first-class hall of entertainment.

In the case of an open fire, the air drawn into the room passes out naturally through the chimney; in the case of a stove with an "*appel d'air*," it either finds its way out through the interstices of the windows and door, through which it would be drawn inward by the open fire, or it escapes by apertures purposely made. The flow of air is thus the reverse way to what it is in an open fire. The air in the room is thus in a state of slight compression,—a state which in itself puts a limit to the inflow of air drawn by the stove, which thus is very inferior, as a self-acting ventilator, to the open fire. Complete ventilation in such a case can only be regarded as secure by the help of some means of artificially promoting the extraction of air, which is not always to be easily or economically managed.

M. Planat is decidedly adverse to the plan of warming our apartments through floor openings; the column of heated air entering vertically, ascends, he suggests, to the ceiling without mixing nearly so much with the air of the room as when the heated air is discharged from the sides and at some little height from the floor; and another practical objection is that an opening in the floor receives a great deal of dust, especially when the room is swept, which is then dislodged and sent up into the room when the current of warm air is in full operation.

Heating by steam M. Planat strongly recommends for heating operations on a large scale, as being capable of conveying its heat a long distance without sensible loss; owing to this latter quality, it can be worked from a furnace outside the walls of the building, and thus removes almost all possibility of danger from fire, and is therefore peculiarly valuable as a means of heating museums, or buildings where important documents are stored. The steam system, on a large scale, however, is liable to be inconveniently complicated in working, and requires a good deal of attention. It has the important advantage over stoves and *calorifères* that it never becomes so heated as to render the air unwholesome. Nearly all that can be said in favour of steam can be repeated in favour of hot-water heating, with the addition that it is more easily manageable when in operation. In regard to the expense of working steam and hot-water heating some observations were made by General Morin and others, the result of which was that the two systems were in that respect pretty nearly balanced. Warming by gas, as before suggested, can only be advantageous under very special circumstances; when there is but a very small space to be warmed, and

* See p. 663, *ante*.

when the warmth is required only at varying and intermittent periods; under any other circumstances gas is one of the least economical or agreeable methods of warming.

There remains, however, the "mixed system," which, as appears from M. Planat's observations, is only of very recent introduction in France, and which he believes has not been introduced in this country as yet. Our author sums up so decidedly in its favour as a system for warming large buildings that it is worth while to quote his remarks:—

"In this combination of steam, water, and hot air, it has been attempted to combine the advantages of all the three systems, and eliminate the inconvenience of each. The system is employed only to transport the heat developed in the ordinary boiler; but it provides also a motor power for all the accessory mechanism, without any necessity for a special boiler for this purpose, as in the case of heating by water. All the complication resulting from the employment of steam for direct heating is suppressed, and all the apparatus for the production of heat is below, in one story, and under the immediate control of the engineers. The water which directly heats the rooms receives its heat from the steam by means of a simple coil; its temperature and its effect in warming the air are the more easy to manage since they are directly influenced only by the steam. The advantages of water-heating,—low temperature, regularity, conservation of heat, &c.,—are thus maintained. Lastly, the hot air has only to accomplish a short journey, as the steam has made the greater part of the transit. At the same time all possible inconvenience from the escape of steam or hot water in the rooms is avoided. It appears, then, this system presents a great total of advantages; it is only to be objected that it is a little complicated."

The complication is apparently, however, in the fixing, not in the working; and, for an important building on a large scale, the objection is hardly worth taking into account.

The consideration of the subject of ventilation is one of the best parts of M. Planat's book; it is treated in a very practical and comparatively concise manner, and not so overloaded with formulas and computations as some other portions of the work. The author directs himself especially to considering the conditions under which ventilation has to be carried on under varying circumstances of atmosphere and inhabitation. In winter the action of the fire or other methods of artificial heating naturally acts to produce an influx of air; but there is no such influence in summer. Most dwellings have no method of ventilation in summer except that of opening windows, which may give rise to inconvenient draughts even in warm weather, and which at night becomes "dangerous." This last opinion is no doubt generally acted upon, though, in our opinion, most people entertain a most exaggerated idea as to the danger or inconvenience of open windows in sleeping-rooms; and, in fact, the danger to health from the close unventilated rooms in which the great majority of persons are content to sleep is a much more real and serious one. Many people have accustomed themselves so completely to the idea of close-shut rooms at night, even in the warmest weather, that if they find a window slightly open in their bedrooms they imagine a draught where there is none except what would do them good rather than harm. Any danger they may be under of catching cold from an open window at night is no doubt much promoted by adopting the constant habit of closely-shut rooms for sleeping in; those who are subject to "catching cold" being usually those who have rendered themselves peculiarly sensitive to such attacks by always bottling themselves up from the air; and then the inconvenience and annoyance of catching cold is easily felt and estimated, whereas the slowly deleterious effects of regularly spending several hours out of the twenty-four in a room closely shut up from change of air are not so readily appreciated by those who do not think about the matter. This is not to say that we should not be better for a special means of ventilation for sleeping-rooms, apart from windows, even in summer; but that until such means are established as a habitual adjunct to a dwelling-house, people will consult their own health much better by getting rid of their superstitious fear of open windows. To return to M. Planat: in regard to the admission of air either by inlets connected with the heating apparatus, or by special inlets apart from it, he recommends that these should always be as large as can conveniently be, in order to admit a sufficiency of air at the least possible rate of travelling,—a small inlet, under the same relative conditions of atmospheric pressure within and without, producing, of course, a much quicker in-draught. On this account especially is it desirable that the number and positions of air-supply entrances should be decided on by the architect from the first in contriving the plans: a remark which seems almost a satire on the practical architecture of the day; for how often, in dwelling-houses at any rate, is any such provision exercised? And yet the necessity for it might be thought to be one of the first principles of practical house architecture. One statement in regard to a supposed practice in English house-building is amusing, whichever way we take it, viz.:—that "In England the influx of fresh air is often provided for through the intestices of flooring-boards with open joints, which are covered with a carpet to better disperse the laminæ of air." This is said so seriously that we cannot determine whether it is a piece of conscious or unconscious satire.

The practical conclusion of our author, however, is in favour of special inlets for the introduction of fresh air, so designed and placed as to admit a sufficient body of air slowly, and without direct draughts. In the case of the exit of the air the draught may be stronger and quicker without entailing any inconvenience on the inhabitants of the room. An influx of air at too great velocity maintains itself as a special current for some distance into the interior air of the apartment, and becomes an annoyance to any one who may be so placed as to come in contact with it. A withdrawal or extract tube, however, at one point in the apartment, acts upon the body of air contained in it equably, without setting up a special suction in any one line or direction; and the evacuation is likely to be more effective in keeping up a ventilating movement of the air the quicker and stronger it is. In short, the theory of effective and agreeable ventilation of an inhabited room is a large but slow influx of fresh air, from various quarters if necessary, and a single but strong current of extraction at one point. We may have many inlets without weakening or confusing the flow of air for ventilation; in general, we can only have one outlet or extract, which must be proportionally strong and rapid in order to control and keep in action the flow of air through the inlets. More than one extract, unless in an apartment so large that practically two systems of ventilation may exist at opposite ends of it, is only likely to break up the movement of the air, and make the weaker extract act in opposition to the stronger one, and become an extra inlet, with the additional disadvantage of forming an inward draught in the apartment. The admitted air may be cooler than that in the apartment under certain circumstances: in hot weather it is sure to be warmer, in cold weather it will be so much colder as to require warming in its passage; but the extract-flue must always be warmer than the apartment, or there can be no certainty, or even probability, of its acting as an extract, except with very doubtful and intermittent effect. In regard to this question of the reciprocal operation of the inlets and the extract, one sentence in the chapter we are considering is either incorrect in printing or wrong in fact:—"Aux points où l'air est extrait de la salle, il est bon de réduire la vitesse plus encore que dans les conduits, pour éviter les courants d'air nuisibles aux personnes placées près des bouches d'évacuation." This is manifestly absurd, as in that case the extract would not act at all; and as the writer immediately afterwards observes that the draught towards the extract has far less operation in inconveniencing any one than the draught inward from the inlets, it is fair to presume that there is some misprint in the text.

In regard to the extraction of air from a room artificially heated, some pages illustrated by small diagrams are devoted to showing that the extraction of the air should always be in the lower and not in the higher part of the room, whatever method of warming is used to set up a current. To extract from the higher part of the room is merely to extract all the warmed air, which rises to the top of the room, instead of assisting it to circulate through the room. All the conclusions and examples on this point seem quite sound and reasonable, except in regard to No. 4 diagram, which shows a room warmed by a central stove with an opening at each side near the floor for exit, rather than extraction, in this case. The warmed air heated by the stove is to rise to the top of the room and thereby induce a down-current, which is to escape by the two exits below. This looks very neat and symmetrical in a diagram, but we do not believe it would act; one of the lower openings would become an inlet. Otherwise this portion of M. Planat's suggestion is worth study, and is very plainly and clearly put. Then we have separate chapters on winter and summer ventilation, by way of emphasising for the reader the fact that the conditions are quite different at the two seasons, wherever the temperature is so different that fires are used in winter and not in summer. For winter ventilation the author suggests a central upcast shaft with a current set up by a fire burning in it. Gas, of course, could be used for this purpose, but would be more expensive, and perhaps would gain very little in regard to convenience in the majority of cases, where ventilation was required to be constantly kept up. The application of this shaft system is treated in three different ways,—"*Appel à niveau*," where the extract from each apartment opens at once into the upcast flue on the same level as that at which it leaves the room; "*appel par le haut*," where the heat is supplied at the upper portion of the building and the extracts from the several rooms rise to that point; and "*appel par le bas*," where the heat is supplied at the base of the extracting-shaft, and the extract from each apartment is carried down to the bottom of the building and there turned into the upcast-shaft. In all three cases, in accordance with the principles before expressed, the extract from the separate apartments is from the lower portion of each apartment. We must leave the reader to follow out M. Planat's *pros* and *cons.* in regard to these methods. We have no manner of doubt that the "*appel par le bas*" would prove the most effective in practice, under proper conditions of working, but it would probably require a somewhat stronger heat in the upcast-shaft to ensure the requisite drawing power. For summer ventilation the author appears to think that the same system would answer without the artificial heating, on the principle that the outer air is in that case warmer than the air in the apartments. We should have some doubt of the "*appel par le bas*" answering in that case, however, and there would certainly be many days in an English summer in which the respective interior and exterior proportions of temperature would be such as to invert the current. On such occasions, of course, there would need to be a return to the winter system of artificially warming the extract-shaft. There are, however, one or two English inventions for generating an up-draught by the mere action of the atmosphere on a "cowl" of peculiar construction, which have been found to answer their purpose well. The concluding chapter is devoted to mechanical ventilation, giving a good many diagrams of apparatus for producing it. In summing up the advantages of the several systems, the author is decidedly in favour of mechanical extraction whenever the building is of sufficient size and importance to justify the expense, which must usually be greater than that of ventilation by warming, except in special cases in which motive power is easily available from some source existing for other purposes in the building. As he observes, we cannot in any other way have so complete and uniform control of the currents of air as in regulating them by mechanism, the action of which can be varied at pleasure and adapted to all the different conditions of heat and barometrical pressure.

In spite of a certain amount of pedantry and an unnecessary and often tedious elaboration, the book published by M. Planat is certainly a most important contribution to the literature of warming and ventilation, and is worth the attention of all who are specially interested in the subject.

Salford Baths and Wash-houses.—The General Baths Committee of the Salford Corporation, in their annual report, just presented, state that the first summer season during which the new baths have been open has been very successful, the total number of bathers being 58,844.

A GREAT FRENCH EXPLORER.

THE recent death of the eminent French archæologist, M. de Saulcy, whose name will ever be connected with the valuable collection of Judaic remains he brought to France, and which now reposes in the museum of the Louvre, recalls many memories,—memories of that valiant band of seekers into the history of the past which is daily, page by page, being written by their patient hands. Little by little the history that seemed but a short time since so barren teems with life; quietly the researches of the archæologists people the silent streets of cycle-buried cities, the untrodden high-roads of bygone civilisation.

Of this valiant band was M. de Saulcy, and in the ranks of the army of archæologists his loss will be keenly felt. The day happily has come, however, when even such a gap can be filled in, and many an eager volunteer will be found ready to spring into the place, to lead forward the attack on Antiquity's silent strongholds. From every country these volunteers pour in, as they have done, indeed, within the comparatively few years that the common cause has been proclaimed, from England and from France, from Italy and from Germany, eager to help each other. In this army the list of those also who have already fallen is a long one; all have died sturdily, and not till they had fought the good fight to the uttermost of their powers did they sheath the weapons of their onset.

Very recently an interesting work has appeared in Paris, in which the debt that the world owes to the memory of one foremost among these warriors, Botta, has been gracefully paid.* Botta was an officer of high standing in that army of which we have spoken: his efforts led in a new direction, and, side by side with a brother soldier, Layard, they were crowned with a success that astonished and benefited the world. The sudden evocation of a civilisation, the remembrance of which was kept alive in faded traditions, themselves of no small antiquity, was a pleasurable surprise to the learned world of a generation ago. We of the present day, rendered *blasé* on the matter of discoveries, living as we do when telegraphy, when the electric light, the practical application of steam, the telephone, the microphone, the doctrine of selection, and what not, have come one after another to inure us to receive with perfect composure the relation of anything that but a short time since would have appeared positively wild, can form little or no conception of the effect first produced when the discoveries of Botta and Layard startled the European world of art and letters.

The name of the discoverer of Nineveh has, since that day, become familiar as a household word in every cultured circle, nor is the world likely to forget the services that Botta rendered. But the early life of the archæologist, that preceding the great event with which his name is so indissolubly connected, is less known. It has now been agreeably evoked in the work which Botta's old friend, M. Paul Levavasseur, has edited, and to which he has added an interesting notice of the life and more particularly of the character of Botta.

In 1837, the discoverer of the ruins of Nineveh had been charged by the Museum of Natural History with the pleasant task of an exploration in Arabia, the object of which was to complete the collections made there by Niebuhr. Botta had not at this time acquired his future celebrity. He was a learned naturalist, an excellent Orientalist, who spoke Arab like his mother tongue, and, what is more, the possessor of a mind above common prejudices. At the moment at which he was sent on this mission, his task was not alone to herbalise in Arabia, but to make diligent observations. The French were allies of Mehemet-Ali, and, therefore, to some extent supporters of his policy. Mehemet dreamed of extending his rule over Yemen, and his relations with the Cheikhs of that country it was advisable to watch. In addition, Botta was curious to study in its cradle the Arab nation, of which little else was known than its nomad existence; everything, therefore, combined to add an interest to Botta's journey, and this interest it may fairly be stated remains attached, after forty-three years have passed, to the relation he has left.

What, however, is more interesting than the journey is the traveller himself. Botta was a modest man, who mixed very little in the world, and who, therefore, was personally little known. His name is familiar to many from the fact that his father, Charles Botta, was the author of an excellent history of the Independence of the United States, as also of a history of Italy; but his own reputation he made by the discovery of the ruins of Nineveh. Botta became the founder of Assyriology, and by his researches transformed an almost conjectural branch of history into a positive science. As an archæologist and a scholar, his renown needs no additional remark.

By the few who still survive, that recall the *salon* of Mme. de Mirbel,—we are taken back to the days when the *salon* still existed in Paris,—Botta's place in the little circle will be remembered. Silent and meditative, apparently noticed by none, and yet his presence felt by all, he would sit in the evenings stretched on a sofa in the darkest corner of the room, rolling between his fingers, in Oriental fashion, an interminable chaplet. Evening after evening would pass without his proffering a syllable; his repose was respected like that of a child or of an invalid. Botta was, indeed, both; the baneful habit of opium-smoking, contracted in the East, had undermined his health, while his nature was essentially that of the child, and his timidity, with ladies especially, he never overcame. Mme. de Mirbel was indeed, perhaps, the only woman who ever succeeded in overcoming this, and then alone by the aid of stratagem. In the first place, she was no longer young when Botta knew her, and her tact was of the most refined nature. She waited, before speaking to the *savant*, until the circle had been reduced to two or three intimate friends; in addition, she had established between him and her *femme de chambre*, who was ugly and old, the most confidential relations on all domestic affairs. It was Pauline who ruled the servants of M. Botta; Pauline who settled with the tradespeople; Pauline who superintended the packing of his trunks when he was about to travel; and Pauline it was, above all, who protected the purse of the worthy Botta from pillage. No man was ever simpler in his habits and requirements, but none, on the other hand, was more generous or lavish in his expenditure. It was by dozens that he ordered his boots from his bootmaker. The tradesmen were enchanted to have a customer who was perfectly indifferent to the reception of all their shop-worn or out-of-fashion stock, a good faith equally abused by the eating-house keepers, who would send in fabulous bills for dinners never consumed. Botta, who was never rich, could ill stand such expenses; but through the kindness and affection of Mme. de Mirbel he was saved the distraction so fatal to his pursuits. The affection of Mme. de Mirbel was that of a second mother; she recognised the delicate character of this rare nature, and with a woman's heart protected it; it was her action that placed him in the way that led to his great discoveries; her protection and her counsels obtained his entrance into the Foreign Office; and it was during his stay at Mousoul, where he was named consul, that a good fortune visited him such as the wildest treasure-seeker could never have foreseen.

M. Levavasseur publishes a letter of Botta's, which is interesting, as showing the commencement of those researches which were to lead later on to such astounding results:—

"My successes in antiquities will surprise many scholars. I have unearthed a whole monument on which there are an enormous number of cuneiform inscriptions and historic bas-reliefs. It contains a whole history. If we succeed in being able to read this writing what things we shall learn! I continue, but it ruins me. There is a village built on the monument, and to unearth it I have to purchase and demolish the houses. They do not cost very dear, it is true; ten to twelve francs each; but the diggers cost more,—five francs a day, at least, in all. It is more than I can afford, and I ask the assistance of the Government. In the meantime, and before the decision arrives, which may be long, you must help me. The honour of France is at stake, for the English are ready to succeed me if I interrupt, and it would be a pity to abandon to them the most important discovery that has been made for a long time. I cannot at present afford the leisure to give you any details on my monument; but if you wish to know what it is, ask M. Mohl to come and see you and show you my descriptions and drawings. . . . . Adieu, my dear friend.
P. E. BOTTA."

When, in 1848, M. de Lamartine sent him out as consul to Jerusalem, it was a considerate attention on the part of a poet for a brother in culture, for there existed between Botta and the mystic city not a small degree of harmony. Botta's devotion was of no ordinary nature; to the simple faith of the child he added what is a rarer quality, even in divine affection,—disinterestedness. His good deeds were never selfishly actuated. His house was ever open to the pilgrims; a cordial, though simple, hospitality received them. Speaking of his old friend Botta not long since,* M. Villamus expressed how often he had been surprised to know in what manner Botta was able to afford such incessant largesses. As recompense for his discoveries, the French Government had presented him with a national gift of 60,000 francs, and this was all that Botta ever possessed; nor can this sum have remained long in his hands. His income can never have exceeded the modest sum of 500*l.* to 600*l.* a year, and yet he kept in the East open table, and money ran like water through his fingers. M. Villamus tells us further some curious tales characteristic of Botta. One day Botta asked his friend to send him some beer to complete a medical prescription which had been made out for his cook; two barrels was the quantity considered necessary for this object. On another occasion M. Villamus was with Botta when he was purchasing clothes, and not unnaturally expressed his astonishment at seeing his friend buy twenty pairs of pantaloons. "I shall distribute them," replied Botta, "to those about me." Some years later, when he was French consul-general at Tripoli, a friend asked him at table the colour of the ribbon of a certain order,—one of the most highly-valued in Europe. "I do not know," replied Botta. "How!" cried his chancellor; "why, sir, you have the order." "You are wrong, my friend; I do not think I have it." "But, sir, I myself opened the letter containing the brevet and the insignia, and placed them into your hands." "If that be the case," replied Botta, "you will find the ribbon then, I suppose, in the drawer with the others."

In spite of a feeble constitution and of an even excessive nervous delicacy, his irritation never betrayed itself. Above all, he was profoundly religious, and not with that narrow-mindedness the result of a dogmatic belief. His respect for religious believers came from his heart, whether they were Christian, Buddhist, Mussulmans, or what not.

After an active existence, in the first place as a naturalist, and subsequently as an antiquary, Botta, settled in the desert post of Tripoli, slept away his latter years. Opium is a dangerous friend, which attaches itself only too securely to those who court its fatal influence, and Botta's life may be said to have been little more than one long dream, from which he awoke only to do some good deed of charity. His chancellor and his dragoman watched over him as they would have done over a child. Always dying, and yet alive, his trust was fixed on Providence. All advancement or change in the service of the Foreign Office was positively painful to him. "I only desire one thing," he wrote, "that God shall give me my order of retirement, and men shall think no more of me." But this modest wish was not carried out. The time came when Botta, having long passed the limit of age, was able to enjoy the ease of retirement; but what for others would have been a revival of life was for him to be fatal. The sun of the East was alone able to warm this exhausted frame. No family tie called him to France. His father was dead, his mother he had never seen, of his kind friends Mme. de Mirbel was no more; one alone remained,—one, faithful in death, and who has seen through the press the unpublished work of his old friend. Botta returned, however, like a dutiful son, to his mother country, and it was near St. Germain, in the little village of Achère, that he patiently waited his end. On March 29th, 1870, death came to release him, bearing off his gentle soul as the angel reaper in the poet's familiar lines.

The religious faith that breathes throughout his whole career consoled his later years. M. Levavasseur tells us that not least among the few troubles of his last solitude was the thought that the little parish of Achère possessed no regular vicar. On Sunday only an aged priest of more than eighty, but still robust, came several leagues on foot to perform the simple mass in the village church. This priest had himself travelled not a little as a missionary, and Botta anticipated his Sunday visits with a pleasure more than common. "To his (Botta's) funeral came," tells us M. Levavasseur, "all the inhabitants of Achère,—who have not yet forgotten his familiar face in his too short passage among them,—the heads of the consular service, some plenipotentiary ministers, and not a few distinguished savants. A voice retraced the life

* Relation d'un Voyage dans l'Yemen, entrepris en 1837 pour le Muséum d'Histoire naturelle de Paris, par Paul Emile Botta. Précédée d'une Notice sur l'Auteur par Ch. Lavavasseur, ancien député. Paris, 1880. 8vo.

* *Revue Politique et Littéraire*, Oct. 9, 1880.

of the deceased; it was that of the old priest of St. Germain, who seemed to have forgotten his long walk of the morning, so firm and round was his tone. I was deeply touched as I listened to this noble and courageous old priest, and I asked myself more than once, by what mysterious coincidence it happened that in this little village church there should be present a priest who himself had journeyed far, and who was now called upon to make a funeral address over another traveller, who, during his life, had honoured France by his learned discoveries, and religion by a sincere and enlightened faith."

Those who will be induced to read the "Relation of a Journey in the Yemen" will find in its pages a faithful portrait of the author himself. The style is simple, the judgments intelligent and benevolent, in true accord with Botta's character. He loved the Arabs, that strange people that have taken so large a share in the progress of humanity. The two portions of Arabia, Northern and deserted Arabia, and Arabia Felix, the Yemen, are occupied by two very different populations. It is in the latter that can best be studied that great people who so many centuries ago civilised Spain and Portugal, and which influenced far more than is generally imagined the manners of Europe.

A STUDY OF THE MEDICEAN VENUS.

"Cleomenes, the son of Apollodorus, the Athenian, made me," is the record on the plinth of the far-famed statue who holds her court in the Tribune of the Uffizi Palace in Florence, without paying the homage of a visit to whom no tour in Italy is complete. As at other shrines, the adoration of her devotees varies both in quality and quantity, and some have even ventured to undervalue her charms; but as for some centuries she has continued to hold her pride of place among the relics of ancient art, a renown so enduring is not likely to exist without some good foundation.

She is, without doubt indeed, a beautiful work of art, and she is of beautiful Parian marble; but when and where she had her birth, ancient record sayeth not; and even Pausanias is silent, not only as regards herself, but even in respect to the very name of her sculptor, Cleomenes, which appears on the marble plinth beneath her feet, but not in the list which he gives of ancient statuaries.

Thus some have questioned the verity of the Greek inscription, and have favoured the idea of attributing her creation to Alcamenes or to Praxiteles, just because they deemed that so fair a daughter ought to have a renowned father. Discordantly, however, with these suggestions occurs the fact that there is no description extant of any work by Alcamenes that in any respect agrees with this statue; nor either does it correspond in character or treatment with any production by Praxiteles that we have remaining to us.

The fame of the perished Aphrodite of Cnidos, by the latter artist, has directed many thoughts to him as the possible author also of her of Florence, or at any rate to the idea that it probably must have been at least a near copy of that marvel of the ancient world. There appears, however, to be no sound foundation nor feasible plea for this theory, except that the position of the left hand is similar. The Aphrodite of Cnidos looked towards the right, and not over the left shoulder, as she of Florence does, and held up with her right hand a fall of drapery which descended to a vase by her right foot, instead of that hand and arm crossing and half concealing her bosom, as it does with her of the Uffizi Gallery; so that the attitude of the two statues must have been quite distinct.

Further than this, those who have surveyed with a careful and deliberate eye the especial graces of pose which Praxiteles peculiarly loved, cannot justly trace them in this work. A luxurious sway at the hips was in great favour and estimation with him; and, in as far as we can judge, was a particular attribute in the works of that great sculptor. It is to be seen accordingly in his Apollo Sauroctonos, his Faun resting on a tree, and markedly is this tendency of his art also illustrated in the lately-discovered mutilated statue of the Hermes of Olympia, by him, of which, as we mentioned some months ago, a cast has been received from Germany by the British Museum; where it may be consulted at leisure. Also on a well-known Imperial coin of Cnidos occurs a representation, somewhat freely translated, no doubt, of this celebrated Aphrodite of Praxiteles, the tutelar deity of the place, in which a similar inclination at the hips is to be recognised; but nothing of this is perceptible in the Medicean Venus.

On the contrary, the graces of this figure, which are, indeed, many, are attained without this lateral sweep of line of the body and lower limbs. They are peculiarly her own, and are not acquired in this manner. She rests, principally on one leg, it is true, but with very little sway at the hips. Her body, although inclined forwards, as regarded from a side point of view, is little otherwise than equally balanced in the front aspect, and the charm of the lines of her attitude, which are admirable, is obtained by other means.

These remarks are addressed to dissipate the idea of the Medicean Aphrodite being in any degree a copy of her perished sister of Cnidos; and to submit, on the other hand, that the two Venuses, Aphrodites, or Divine daughters of the sea-foam, hewn and wrought, both of them, from Parian marble, were, in other respects, pretty much as distinct as two ideals of the sculptural poses of gentle female beauty could well be; the one point of resemblance, which Ovid alludes to in his well-known couplet, being alone visible.

The fact that ancient annals are dumb in respect of the name of the sculptor which appears on the base of the Uffizi Aphrodite, suggests a likelihood that he did not execute many statues. Perhaps even he never did but this one great work,—his tribute to Venus,—to be by her alone immortalised! This appears to derive support from the consideration that, as far as data exist, the style and quality of form and composition of the Medicean Aphrodite are unlike those of any other existing work of ancient art. The Apollino has been said to resemble it, but this has been set forth on feeble grounds, such as may suffice in superficial criticism, but will not bring conviction to a careful student of art. Both these ancient works are statues of great refinement of form, but there the likeness ends. There is not in the Apollino that rich luxury of surface which the Italians term *Morbidezza*, that is possessed by the other statue, nor does there exist in him the lavish harmony of line and composition, in every view, that is a characteristic of the sweetly coquettish goddess that bends and shrinks, and embraces herself with her own arms in the Palazzo Uffizi of the City of Flowers. The Apollino is a graceful youth of a feminine style of beauty, but is of another family from the Venus.

In the position of the arms and hands before the figure, concealing the person, other statues of the goddess, in general action, resemble her, but in their air and quality they are different, and in several instances appear more modest because less conscious. It must be acknowledged that the Uffizi Aphrodite appears aware that she has placed herself in a most becoming attitude, and that she looks as if she had posed herself before a mirror so satisfactorily to herself that she was calling on all beholders to come and admire her studied graces. Her artist also has so fully carried out this undulating sentiment of line and figure in the whole work, that even the adjuncts of support in the marble of the dolphin at her feet, and the *amorini* riding on it, partake of the same character, and are so disposed as to harmonise in all respects with the limbs, insomuch that, in a merely decorative point of view, the *tout ensemble* is a triumph of ornament, just as fully as if it were constituted but of flowers, or of purely conventional forms, instead of its being a representation of a beautiful woman, instinct with animation, hewn from the solid marble, with only such supports left as were requisite to sustain it.

An excellent delicacy of personal presence is remarkable in this statue, but, as is usual with ancient classic works, this quality was not sought by making the extremities small. The sculptors of old, indeed, appear to have had some reluctance to employ this facile mode of obtaining *finesse*, and strove for elegance of proportion rather by refinement of contours than by smallness of parts.

This remark does not apply, of course, legitimately, in this statue, to any portion of it that is not original, and therefore not to the hands, which are restorations; but in respect to the feet, these are certainly not by any means small. The statue represents a woman who, if she stood up to her very utmost height, would scarcely reach 5 ft. 2 in., while living women are to be found in England much taller in stature than this, with feet no bigger, nor indeed even so large. These feet, however, which are original, have apparently supplied the measure of length for the restored lower arms. It is a standard of much value and of ready application in sculpture, and one that has been relied on, among others, by the great Thorwaldsen, that the length from the elbow to the wrist-bone, should coincide with that of the foot from the heel to the tip of the longest toe. This seems to have been known by, and adhered to, by the restorer of the arms of Uffizi Aphrodite, and the feet being of full-size and length, this has been the cause of the lower arms of the restoration being, perhaps, a little long, although this is not striking because of the bent position of the arms.

The statue was in a sadly mutilated state when it was found, having been broken at the middle of the body, at the thighs, the knees, and the ankles, and at the right arm, close up to the shoulder; the whole of that arm having been lost, and just below the elbow of the left arm, that lower portion having also perished; so that, for the arms now on the figure we are almost wholly indebted to the skill of the restorer, so that we have reason to be thankful that the marble creation is presented to us now in so fair a guise as it is.

On a critical examination, however, it cannot escape observation that the restored portions, although apparently correct in disposition, are not in detail so natural as the rest of the figure, although they deserve a high meed of comparative praise for the cleverness with which they are wrought, and the evidently sincere aspirations of the restorer. Impressed by the excellence of the torso and lower limbs, he applied himself to seek a similar perfection of grace and delicacy in the upper limbs, and has in degree sacrificed truth to sweep of line, especially in the right arm, in which he has somewhat bent both bones of the lower arm to meet his views. Both wrists, also, show signs of this yearning for flow of line; but the mark has been somewhat overshot.

There is little doubt that the *soupçon* of affectation which exists in this statue is much due to the conventional character of these restored parts. Had the hands and arms been more natural and more in accordance with the treatment of the rest of the figure, a simpler and more classic effect would have been produced. It may be remarked, however, *en passant*, that they present a notable instance of the force of precedent, even when it is not well founded, as although these arms and hands have no original authority, being but restorations of the lost parts, yet having been so long closely associated with this beautiful ancient statue, they have had a strong influence on these portions of the female form in modern sculpture, in inducing an over-degree of bending of the lower arm; and nowhere is this more perceptible than in some of the works of the great Italian sculptor Canova.

It is apparent, also, that the restored fingers are too slender to accord with the original toes; for in Nature the upper and lower extremities are usually in harmony. Probably the original hands were less like those which have been restored than to that well-known example of "The Roman Lady's Hand," so-called, which has the appearance of having been moulded and cast from Nature, and which has also been romantically attributed to that arch *empoisonneuse*, the Marquise Brinvilliers, the fingers of which in that case may have mixed her deadly potions; and also to the beautiful Princesse Pauline. In this elegant hand the fingers are plumper than those restored to the Medicean Venus, and the wrist is less forced in line than her wrists, which have a certain artificial character, which, although they must be allowed to be graceful, are yet thus, from the above cause, scarcely satisfactory.

As the whole statue was, doubtless, originally in one piece of marble, very noteworthy is the excellence of the workmanship of the portions of the bosom and torso immediately behind, and close to, the hands. This proximity must have been very embarrassing in the execution of the work, and yet perfection of contour and surface has been attained notwithstanding.

One may be allowed to wonder whether the inside of the original hands, so little removed from the body, were worked out with equal completeness, as the slenderness of their detached fingers and their consequent fragility in marble must have added to the difficulty of their execution. Of course, this was easy enough

to do in the restorations, as these were worked separate and away from the figure, and afterwards affixed. It is evident, however, that whatever have been the modern improvements in the working of metals, the tools of the ancient sculptors were of an excellent description, of which, indeed, the clean undercuttings of the highly-wrought draperies of the Parthenaic marbles are sufficient evidence. Thus, also, in situations so difficult to get at as the undersurfaces of hands of this Venus, tools were, no doubt, especially fashioned and bent for the purpose.

Much as this interesting and celebrated statue is prized, she is not well placed in the Tribune of the Uffizi Palace. Fine works of the sister art are associated with her in the same room, which are the frequent subjects of study and of copying by artists whose easels not unfrequently interfere with her being seen freely and to advantage from the best points of view. Most surely she is worthy of an apartment to herself, and should have a little temple or "Ædicula" solely dedicated to her, in the City of Flowers, such as whilom her perished sister is recorded to have possessed in the town of Cnidos.

Far different have been the fate of these two Aphrodites. She of Cnidos,—we know who made her,—Praxiteles, in the fourth century before our era,—held court in that city for a long period; after which, on the spoliation of her native grove and habitation, it has been supposed that she was taken to Rome; whence subsequently she was removed to Constantinople, where eventually she perished in the fire of the Laurian palace. In respect to her of Florence, we know not the period of her birth, but at present she is in safety in that lovely city which is her modern home. She, however, also was the subject of spoliation in the time of the first Napoleon, and went to Paris for a while, from which adventure, however, she returned, without injury, to her former place of rest. So much have we of her latest history, but as to where and when she was originally made seems shrouded in oblivion.

Although there appears not to be any case made out sufficient to invalidate the simple Greek inscription which appears on her base, namely, that she was the work of "Cleomenes, the son of Apollodorus, the Athenian," it by no means follows that she was made at Athens. Several of our finest ancient statues extant were the work of Greeks living in Rome during the Empire, and it may not improbably be that she was one of these; for, at any rate, there is no record of her as having been brought from Greece.

The Romans disdained the grasp of any weapon save the sword or spear, and the chisel was not for the hand of the conquerors of the world. When Imperial Rome desired statues, her patricians did not apply to a fellow-citizen to furnish them, but to some Greek dependent or slave, whose intellect, however, might be far above that of his ruler and master. In following this view, there appears no reason to attribute falsity to the inscription under the statue, or to doubt the truth of its record that it was the work of a Greek of Athenian parentage; but it is somewhat remarkable and singular that the nose of this charming figure should be more Roman than Grecian: at least it is in degree aquiline, and thus a feature which no other Greek female statue possesses. This might have been adopted by Cleomenes, either under order from his superior, or by his own predilection, from some Roman maiden of blue blood, or even from a *piquante* and graceful model from the Campagna. However this may be, it is one of the points in which she differs from other Aphrodites.

In respect to the uncertainty which rests upon her in regard to the date and site of her birth, on the one hand it may be said that the exquisite and much sought marble of Paros of which she is executed was early exhausted from the quarries of that island, and this might favour placing her period not later than the most palmy time of Greek art; while, on the other side, it may be shown that there is nothing conclusive in this, as many blocks of this beautiful marble were doubtless preserved as portions of architecture, or by other means, up to the date of Imperial Rome, which were available for such a small compact statue as she is. Also it is to the point of her period of birth not being early that the name of her author does not appear on the roll of the sculptors of ancient Greece.

No light, either, is thrown on this obscurity by any ray to be elicited from the discovery of this statue in the time of the Renaissance, as an almost equal want of information attaches to the time and place of this event. She is reported to have been found somewhere near Rome, broken into thirteen pieces, in the fifteenth century, but she did not adorn the Villa Medici until the sixteenth, and was transferred to Florence not before the latter part of the seventeenth, retaining as an affix to her title the name of the family to whom she had previously belonged.

That she is the perfection of female beauty is open to grave doubt; but in regard to her being a most beautiful, graceful, and refined work of art, there is none. It has been objected to her that her head is very small for a living woman. Intelligently regarded, however, it is evident that if it were made larger the proportion and grace of the figure would be injured. Rather thus, with due consideration, and without effort, we may justly adopt the view, not that the head is unduly small for the figure, but that the whole figure was advisedly executed on a slightly reduced scale, so as to give delicacy to the larger nude surfaces of the body.

Burke, in his "Essay on the Sublime and Beautiful," entitles one of his sections "Beautiful objects small," and affirms that, "attending to their quantity, beautiful objects are comparatively small." "I am told," he adds in another place, "that in most languages the objects of love are spoken of under diminutive epithets, and this is so in all languages of which I have any knowledge." He might have added as an example of the application of a diminutive, the frequent use of the word "Signorina" in Italy as an address of gentle respect to a lady. And this title might well be applied to the Florentian Aphrodite as a term of admiring endearment, appropriate to one who is a true Signorina among statues. It may be noticed also that a similar slight reduction from the exact scale of female life has been occasionally adopted, even in portraiture, by the most famous painters.

This view of the subject may well afford a certain satisfaction in contemplating this beautiful statue, namely, that her head does not necessarily represent one that is too small for intellect, but rather that the proportions of the whole figure have been somewhat reduced with the object of thereby obtaining superior refinement. Under this view she is to be considered as slightly diminished in scale from life; and if not of the highest order of beauty, she is none the less, perhaps, for that, a marvellously-attractive creature.

Scarcely may she rank as an Olympian goddess of the most elevated level of Homeric poetry, nor of the loftiest period of Greek sculpture, such as Phidias or Praxiteles might have produced, but we may still well cherish the conviction that she was the creation of a consummate Athenian artist, although in response, not improbably, to the behest of a Roman Mæcenas.

THE TWO WATER-COLOUR EXHIBITIONS.

THE Society of Painters in Water-Colours, and its younger rival the Institute of Painters in Water-Colours, as usual opened their private views on the same day, Saturday last, to wit. It would be much more convenient for those who like to attend private views if the two societies would avoid this, and open on different days; and it would probably be better for both of them as far as regards the sale of drawings.

The winter exhibitions of both societies are very good. The "Society," *par excellence*, has almost dropped the pretence of making the winter show a "sketch and study" exhibition, it practically becomes very nearly a second annual exhibition; but there remains still the advantage that a member can send a sketch or sketches, if he has any that commend [themselves to his judgment as worth exhibition, without in any way prejudicing himself; and of this advantage some few members avail themselves. At the Institute the "sketch and study" theory is more frankly adopted, and a good many of the contributions come confessedly under this head, more so even than usual, in this year's exhibition.

The Institute shows a very interesting collection, with much less than usual of the mere drawing-master's drawings, against which we have often protested. It is partly from this fact that a certain contrast between the prevalent styles of the two exhibitions seems more than usually brought out this year. The Institute, in its best contributions, is the home of the school which aims at broad and powerful effects; the Society rather represents the refinement of manipulation of modern water-colour. The best landscapes shown at the Institute keep up for the most part the traditions of the days of David Cox, and give us effects obtained by broad washes and powerful touches rather than by minute finish. Mr. Syer's large "View near Wells" is a representative specimen of this school of landscape; a little too rough, perhaps, in its middle distance, but powerful in its foreground, and fresh and bright in its open-air effect. Mr. Collier, who is usually the main pillar of the Institute in this style of landscape painting, only sends some small and comparatively unimportant works this year, of which, however, his "Snowstorm over Carnedd David" is remarkable, and should not be overlooked. Mr. Orrock's "Summer Day on the Yorkshire Moors" is another work remarkable for its true qualities of water-colour effect, and the success with which it represents gradations of distance and aërial effect. "A Cornish Bulwark," by Mr. Philp, is a fine study of cliff, with the sea washing far below. Another remarkable drawing of a similar class is Mr. Aumonier's "A Bit of the Yorkshire Cliffs"; in this case the cliffs are seen from below, with a foreground of vegetation,—very powerfully treated,—and a number of seagulls flying out of the picture, so to speak, towards the spectator, put in with great force and relief. Mr. Harry Johnson's "Wyndcliff, on the Wye," is a fine drawing, with a fortunate combination, in the middle distance, of freedom of style with very tender and delicate effect. Among landscapes of more delicate finish, and perhaps rather more conventional effect, are one or two of Mr. Vacher's Egyptian drawings, especially the "Palace of Rameses III., with the upper portion of the yellow-tinted ruins in warm sunset light. Mr. Houston's "Stonehenge" (by moonlight), is a remarkably careful study of moonlight effect, and the old pre-historic stones, too, are very carefully drawn, and their character well shown. "After Sundown, Lucerne," by Mr. W. L. Thomas, is a fine piece of evening effect, in which nature is perhaps a little helped by art. Mr. Boughton's "Autumn Ramble by the Spey" is charming both in regard to the landscape and the figure which forms the centre of it; in feeling, tone, and composition, this is quite a perfect little picture. Two or three rather finished sketches, by Sir Coutts Lindsay, "The Harbour Fife," and "Desenzano, Lake of Garda," are so admirable in their combination of freedom with fidelity as to make us wish their author had done, or at all events exhibited, more work of this type. Lady Lindsay's "Souvenir," close by, the head of an Italian girl, is also excellent.

Figure subjects are usually rather prominent at the Institute, but less so than usual on this occasion. Mr. Linton confines himself to the single figures which may be termed studies of costume and colour rather than figure studies; they represent two apparently fine young women very much dressed, dressed up to the eyes, almost, under the titles of "Autumn" and "Winter"; the latter, with the rich amber dress and crimson scarf, is a very fine piece of colour, and exhibits that combination of high finish with dignity and largeness of style which usually mark everything from Mr. Linton's pencil. A kindred subject in its nature is the clever and delicately-studied drawing by Miss Gow, "Beggar my Neighbours," representing two little girls at a game of cards, a sofa and other accessories introduced; the children are nice in character, but the real interest of the drawing is as a study of browns and lighter but kindred tones in a combination peculiarly refined and agreeable to the eye. Mr. Edwin Bale's two drawings of a little Oriental-looking child with a brass pitcher, seem painted very much for the sake of the brass pitcher, which is the best thing, at all events, in each drawing. Mr. G. Clausen, whose name we have observed as generally connected with drawings which seemed rather to fall short of their apparent aim, has made a striking success in his small but very powerful and pathetic drawing "Waiting for the Ferry"; in the foreground a strong, sturdy woman, in sabots, stands fixedly waiting for the boat, which is just descried under the dusk of the opposite bank; on the bank some figures are relieved against the evening sky, which is partly reflected in the river. There is nothing unusual in the motive of the drawing, but it is very remarkable

for its power and its complete unity of effect and expression; it is like a picturesque moment snatched out of actual life and fixed on paper, in a style of handling which gives us all the essential poetry of the scene without any disturbing details. Mr. Hugh Carter's landscape and figure subjects are so palpably suggested by Israels, without the pathos of Israels, as to produce rather a sense of annoyance. Mr. Beavis's "Sand-cart, Pyrénées Orientales," is a good work, and a picture with two figures, by Mr. Towneley Green,—an old man and a young girl,—under the title "The Grindstone," should be carefully looked at; the two faces are most beautifully and minutely studied in character, expression, and modelling. The small room contains some very good studies in black and white by Mr. Walter Wilson (who also has among the coloured drawings some original studies of shipping), Mr. Lionel Smythe, Mr. Tenniel (*Punch* cartoons), and others.

The remarks which we made last week as to the too great frequency of exhibitions can hardly apply, it must be admitted, to the Society of Water-Colours, for the extra exhibition in winter is quite as good as the principal one in spring. Two of the lady contributors, Mrs. Allingham and Mrs. Angell, show an astonishing power of keeping up both the quantity and quality of their work in each of these semi-annual exhibitions. The former is quite up to her usual standard; the latter has surpassed herself,—in the matter of flower-painting, at least; her "Chrysanthemums" could not be praised too highly. The beauty of Mrs. Allingham's little idyllic pieces lies not only in the delicate finish of the figures and the landscape taken separately, but in the combined expression of both, the landscape and the figure appearing always such a complete and united whole. If we compare the Society, as a whole, with the Institute, there is in the main a decided difference of aim; the best works in landscape at the Institute are nearly always those which aim at the representation of the simple facts and feeling of nature in the manner to which water-colour best lends itself (only unfortunately such works are often far too small a proportion of the whole number); in the Society a considerable portion of the best landscapes are among those which aim at giving some special and poetic interpretation to nature, or at representing some peculiar effect by peculiar means. And thus there seems to be formed almost unconsciously a peculiar prevalent tone in the Society's exhibitions, in which strong and bold effects are the exception, and delicacy of treatment is the object. Thus such a landscape is Mr. North's "Autumn," which is like a dream of a landscape rather than like one of open day and common air, would be quite killed on the Institute walls. Where it is, it is in keeping with the general key of the place. The general level of intellectual interest is unquestionably, and has been for some time back, decidedly higher at the Society than at the Institute; nevertheless, we think the BEST of the Institute productions belong to a more healthy and genuine school than many of those very delicate and poetic, but occasionally somewhat unreal, landscapes which we see on the Society's walls. There is no doubt, however, that the present winter's exhibition in Pall Mall East is a remarkable one for the amount of fine work which it includes, of which we cannot profess to mention any but a very small part. Mr. Walter Field has been doing Henley in one or two drawings which happily combine topographical accuracy with effect. A comparatively new contributor, Mr. T. J. Watson (not to be confounded with Mr. J. D. Watson), from whom we from the first expected a good deal, keeps rising, and his "In a Wood" and "Sketch on the South Coast" are fine things, the latter literally a sketch, though very bold and on a large scale. Mr. Thorne Waite also contributes a large and powerful out-door sketch at "Parham Park." Mr. Walter Duncan has not returned to the poetic class of subject which he at first promised us, but his prosaic figures in "The Novel" and "With Wind and Stream" are as good as anything of the kind could be; the former especially, a drawing of a girl sitting sideways in a large chair and absorbed in a book: it is remarkable, though a small work with only the simplest subject, for a largeness and vigour of style which give it high interest. But we are anxiously looking for some more serious effort from this artist. Mr. Marshall, one of the recent members, has a beautiful work, "November's Hail-cloud drifts away," a very finely-composed landscape. Mr. J. D. Watson's corners of places with single figures, character figures, as one may say, are, as usual, interesting and various. Mr. G. K. Johnson's little girl standing on tiptoe to examine "A Sunflower" we like much better than his grown-up young women, who are nearly always (as in "Lilium Auratum") characterless and uninteresting. Mr. Matthew Hale seems to develop some new qualities in this exhibition; he has several admirable sketches, among which "A Lonely Moor" is exceedingly powerful and poetic. Mr. Henry Wallis shows his versatility remarkably in two works, one "In the Uffizi Gallery," an interior study, with the well-known seated figure pulling a thorn from its foot in the immediate foreground; the other, "A Study," a wild scene in a forest where trees have been overthrown, apparently by a storm. Other well-known contributors, Mr. Naftel, Mr. Davidson, Mr. Albert Goodwin, Mr. Tom Lloyd, Mr. Carl Haag, &c., are represented. A word is due to Mr. Parker's admirable studies of picturesque bits of old towns, especially "Place St. Yves, Vitré." Neither Mr. Alfred Hunt nor Mr. Boyce has been able to exhibit, their non-appearance leaving certainly "a gap in our great feast."

A special feature is the collection of some of the works of the late Mr. Dodgson; among others, a large and rather idealised but very fine view of St. Paul's from the river, which we do not remember to have seen before. On the whole, it may be doubted whether Dodgson's works are not likely to be more esteemed when seen separately. His style was a beautiful one, and it was of his own making, but his range was limited, and this fact becomes the more apparent when a good many of his drawings are brought together. Some of them, however, are, as far as they go, perfect works of water-colour, in regard to feeling for nature, rich tone and colour, and purity of style.

WILKIE'S "READING THE WILL."

ENGLISH ART ABROAD.

THERE appeared some excuse in 1854, when we first visited the Pinakothek at Munich, for finding in the section devoted to modern art but one English and no single French picture, because at that time the New Pinakothek, the work of the architect Voit, had been completed little more than a year, and the pictures which more or less adorned the architect's work might not have exactly found their proper destinations; but on revisiting the famous, and it must be owned greatly over-rated collection, it is somewhat disappointing to see that no additions have been made, or no attempt to support by adequate surroundings the one English picture, the famous "Reading of the Will," the exquisite work of Wilkie. We remember perfectly, on suddenly coming upon this picture, experiencing probably something like the sensation which more recently our countrymen have so often enjoyed in Australia at the discovery of a nugget, after labouring for a long time unsuccessfully in their field of operations.

It has been often remarked that there are painters who owe much of their popularity and distinguished name to the careful and skilful work of the engraver, and doubtless, in not a few cases, such is the fact; but perfectly as the works of Wilkie have been engraved in England, the fame of the engraver has in most instances been enhanced by the association of his work and name with the thoroughly intelligent and beautiful art of the great Scotch painter. It must be conceded that after 1821, when Wilkie painted his "Reading the Gazette of the Battle of Waterloo," a perfect style had reached its culminating point, and from our remembrance of the condition of the Duke of Wellington's picture when last we saw it, it has stood the effect of time very much better, notwithstanding the supposed deteriorating nature of a London atmosphere, than the "Reading of the Will," painted but one year earlier, although it has reposed for so long a time in the clear, high position on which Munich stands. But, alas! the "Reading of the Will" has been in the hands of "the competent restorer," and those terrible cracks that result from the use of asphaltum, or some equally dangerous transparent colour, and which fascinated so fatally our painters of the beginning of this century, and which, when we first saw the "Reading of the Will," twenty-six years ago, had already made a fearful progress throughout the surface of the picture, have now all been reduced to an equal surface, it is true, but there remains something more than a suspicion that the noble picture has been sadly injured.

There are certain galleries and collections of pictures in Europe that have gained, it must be owned, a not altogether well-deserved popularity, owing, perhaps, in many instances, to something euphonious or "catching" in their names; and amongst these both the New and the Old Pinakothek of Munich must certainly be placed.

RAILWAY SERVANTS, THE PUBLIC, AND THE BOARD OF TRADE.

THERE are sounds in the air which betoken the danger of a railway collision of a serious kind. It is a long time since the facts which tend to the production of this collision have been known to men familiar with the subject. Not a few of them have, from time to time, been pointed out in our own pages. But the deputation of railway guards, signalmen, and engine-drivers, representing the Amalgamated Society of Railway Servants, which waited on the President of the Board of Trade on the 2nd of December, has had the effect of putting the danger referred to in a stronger light. The collision of which we speak is not between one train, or one engine, and another, but between the Directors of the Railway Companies of the United Kingdom and the executive Government of the country.

The object of the deputation was to urge upon the Government the necessity of further legislation for the prevention of railway accidents. On this subject there is no class of men to whose experience more value is to be attached than to that of the operative servants of the railway companies. The force of this remark will be at once seen by referring to the general reports to the Board of Trade on railway accidents. Taking the year 1878, to which an unusual degree of safety has been credited, 1,032 persons were killed, and 3,513 injured, on the railways of the United Kingdom. Of these, 160 persons killed, and 1,307 persons injured, were passengers; and 452 killed, and 1,951 injured, were officers or servants of the railways. In this year the number of passenger journeys (exclusive of those of season-ticket holders) was 562,732,890; a figure which is swelled to more than 670,000,000 of journeys if the season-ticket holders are taken into account. If we suppose that each passenger took on the average two journeys a week, we should have a total of some 6,600,000 individuals, amongst whom the above-named 160 deaths and 1,307 serious injuries would have to be distributed, giving in round numbers one death in 40,000, and one injury in 5,000, passengers, allowing each of them 100 journeys in the year. The number of railway servants is not stated in the Government returns. It has been estimated at 300,000; and if we suppose that to be anywhere near the mark, there will have been one death out of every 666, and one accident, of sufficient gravity to attract the notice of the Board of Trade, out of every 153, servants employed by the companies. We have not seen the subject put in this light before. In fact, as far as we are aware, there exist no data affording absolute information on the subject. The Board of Trade Report, which glories in the fact that in 1878 only one fatal injury occurred to a passenger, from causes beyond his own control, out of 23,540,000 passenger journeys, gives a calculation which is, to a certain extent, highly reassuring to the public. But it selects the rarest of all accidents, and refers these to the largest number of journeys, so that the ratio by no means represents the safety of a traveller, but only his safety in one individual journey. On the other hand, as to the proportion of injuries among the railway servants, the report is not only absolutely silent, but it does not furnish the means of ascertaining the proportion. It states the deaths and accidents reported, but it does not show the danger-rate, or state the number of persons among whom those injuries have been distributed. If this were done, the horror of the public would be great. It should be observed that even if the number of railway servants attains half a million (which, we think, must be very far in excess of the reality), the proportion would still be as high as one death out of every 1,106, and one reported injury out of every 255, servants,

in the course of a single year. It cannot be said that this is a satisfactory state of affairs.

Mr. Evans, the secretary of the Amalgamated Society, urged that immediate effect should be given by the Legislature to the recommendations of the Royal Commission on Railway Accidents; that discretionary power should be given to the Board of Trade, under review by a new appellate tribunal; and that all companies should be required by law to provide all trains, goods and passenger, with sufficient brake power to stop them within 500 yards. We cannot but regret that a deputation with which our sympathy is so strong should have been so ill-advised as to suggest remedies which are so crude in their conception. If the deputation had developed the considerations which we have above indicated, and shown what was the death-rate and what the injury rate among that picked and highly deserving body of public servants in whose hands the safety of the travelling public lies, and had asked for a public inquiry into the causes of this danger, and the means, of a more thorough kind than those attempted by the Commission of 1877, that might be adopted to avoid them, they would have had the public with them altogether. But in suggesting details of legislation the deputation went *ultra crepidam*, with the usual result. Mr. Chamberlain pointed to the Report of the Accidents Commission to the effect that they were "not prepared to recommend such an interference with railways as would impair in any way the responsibility of the companies for injury or loss of life caused by accident on their lines." To place the proposed discretionary powers in the hands of the Board of Trade would be to take the most objectionable part of the plan for transferring the management of railways to the Government, without gaining any of the advantages of such a transfer. And the proposed spectacle of the Board of Trade contending with the companies before a new tribunal would be one hardly reconcileable with the dignity or utility of the Government of any civilised State.

Again, while we are fully of opinion that trains are now frequently unprovided with sufficient brake-power, we have the firm conviction that the efficiency of very powerful brakes in producing absolute safety has been much over-rated; and that the new sources of danger which arise from the use of such brakes have been wholly left out of sight. If we look on the series of disasters that occurred some few weeks ago, we find that at least as much danger was caused by reliance on these brakes as was prevented by their adoption; while it was only the presence of mind of a guard (of whose reward by the company we have not heard) that prevented a calamity more frightful than any yet recorded from automatic action of a self-acting brake at the wrong time. It is both idle and mischievous to take up a cry as to one out of many precautions, as if that was all that is required.

Mr. Chamberlain, however, took the bull by the horns, when he said that "if the companies will set their backs to the wall and defy public opinion, there will be no alternative but for the Government to lay a statement of the case before Parliament, point out how ridiculous is the position of the Board of Trade, and ask for such further powers as may be necessary!" There is no doubt that in the matter of railway inspection (just as is the case in that of sanitary inspection), the absolute want of initiative power on the part of the Government is a great public evil.

The recent number of *Fraser's Magazine* contains, under the head of "The Problem of Railway Safety," remarks on this subject which deserve attentive perusal. The refusal of the directors of the English lines to supply the information of which the Board of Trade reports have been so long vainly declaring the need, is contrasted with the procedure of the French and the Belgian Legislatures, and with the full and detailed official information given by the Commissioners of the Railways of New South Wales. The direct relation between the variation of speeds (as between different trains), and both the earnings and the safety of the lines, are pointed out. And it is shown that, if it can pay the great trunk lines to carry minerals at rates of freight kept down by the competition of sea-borne coal, it would pay them no less to carry passengers at one-sixth of a penny per mile.

The great thing that we now wish to show is, that the interests of the railway servants are identical with those of the travelling public. As to this, we think there can be no contention. Further, it is our opinion that the interests of those two great classes of persons are identical with those of the railway companies themselves, intelligently considered. And we therefore anticipate that if the companies continue, as the President of the Board of Trade said, to set their backs against the wall, collision with Parliament and with public opinion will come, sooner or later, and the later the worse for all parties.

THE CONVERTIBILITY OF THE IMPONDERABLE FORCES.

THE PHOTOPHONE.

THE lecture of Professor Graham Bell, which we announced in our number for the 27th ult., and of which we gave some anticipation in an article on "Noises" in the same number, was delivered at the Society of Arts on the 1st current. Our readers cannot be unaware of the fact that the last forty-five years have witnessed the successive discovery and application of a number of different methods for appreciating and utilising vibrations so small that "to any thick vision they are indiscernible." The first occasion, so far as our personal knowledge of the matter goes back, on which it was sought to apply to the service of daily life the results of the scientific probings of the phenomena of vibration, was in 1835, when Mr. Robert Stephenson was making what was called the Euston Extension of the London and Birmingham Railway; that is to say, the line from the Camden Station to Euston-square. The inclines on this line are what was then considered very steep. There is one gradient of one in seventy-five, and one, if memory serves, of one in sixty-six. To draw the trains up these inclines it was considered that it was necessary to use stationary power; and winding-engines with large drums were erected at the Camden Station, while sheaves were laid in the middle of each track of way to carry the rope of four miles long. The question of how to give to the engine-man at Camden a signal from the station-master at Euston much exercised the mind of Mr. Stephenson during the construction of the line; and Professor Wheatstone was one of the men of science whose co-operation was requested. The first experiments of Wheatstone were made with a view to the conduction of the vibrations of sound. Among other experiments, a wire was led from the sounding-board of a piano for some distance, and connected with the resonance-box of a violin. When the piano was played, the violin gave forth the tune, and that in the notes of the original instrument rather than in its own. Then followed the application of the electric current to the transmission, not of sound, but of motor vibrations, leading to the admirable results of the various electric telegraphs, the construction of submarine cables, and finally the creation of a new alphabet, the Morse code, which has already attained an unrivalled excellence, although the printing tapes used still admit of great improvement and simplification. For some forty-two years the attention of physicists was chiefly directed to the improvement of the mode of transmitting vibrations that would produce motion at a distance,—telemotors, in fact,—although in such minute doses as only to be available for signals. But even in this work, the introduction of the imponderable index of a ray of reflected light, the invention of Sir W. Thomson, was needed to afford a mechanism sufficiently delicate to be acted on by the small force transmitted through a long cable.

Some two years ago, the attention of telegraphists reverted to the original aim of Mr. Robert Stephenson, the transmission of sound, and since that time a whole continent of vibratory facts has been explored,—explored so far as to lead us to believe that we are yet only on the confines of discovery. The telephone was lectured on by Professor Graham Bell at the Society of Arts in 1878. By this instrument the vibrations impressed by the human voice on a disc placed at one end of the line of electric connexion are audibly thrown out as repeated by a corresponding disc at the other end. Then came the phonograph of Edison, by which the effects of the vibrations were so impressed on a yielding metallic surface that the sounds which made the dents could be reproduced from those same dents at will,—a wonderful invention, the full utility of which is yet by no means realised. Then came the microphone of Professor Hughes, in which, by taking advantage of the different vibratory elasticity of different bodies, a series of sounds committed to the magic custody of the transmitting wire can be magnified, even as visible objects are magnified by the microscope. The last invention, the photophone, seems to sum up the labours of the previously-named discoveries. It grasps Sir W. Thomson's imponderable lever; it utilises Wheatstone's insulated wires; it uses the telephone and the microphone ideas; and it crowns the whole by taking advantage of the discoveries of Baron Berzelius and Mr. Willoughby Smith as to the special electric qualities of the rare and newly-discovered metal, selenium, in its two allotropic forms. So sensitive is this metal to the influence of light that its power of electric transmission varies, with incalculable delicacy, according to the incidence of light on its surface. Thus if a plate of selenium is made to act as the receiving surface of a telephone, the sound received by this plate, or rather absorbed by it, will vary according to the light which falls upon it at the time of reception. That modification is effected by the use of a mirror, placed near the mouth of the speaker, the light from which is collected by a parabolic reflector, and sent through the selenium cell into the telephonic circuit.

We hope that a full and illustrated account of this last physical triumph will be published. It often occurs that the most brilliant inventions, like new-born infants, sleep much and for a long time after their birth. Some of the inventions to which we have referred have seemed to slumber in this way. How soon the photophone will find its place in the great order of vibratory movements, utilised for the service of man, it is impossible even to guess. All that we can see clearly is that we are collecting the elements of a new physical science and industry of which it is impossible to imagine the range or the limit. What Grove did in opening men's minds as to the co-relation of the physical forces, Graham Bell, Edison, Hughes, Sir W. Thomson, and others are doing for what used to be called the imponderables. We hardly like to use the term "conversion of motion into electric tension," but such, at all events, is the phenomenal explanation of the electric light. Now, the extreme delicacy of the relation of the vibrations of light and of sound has received a most unexpected illustration. And the result is that we are reconsidering our conception of the nature of solid matter. We have had to throw overboard the ideas formerly implied by the words solid and material. We form some faint idea how intimately heat enters into the constitution of matter; how light and heat and sound are, so to speak, allotropic forms of the same energy. All this is only paving the way for that transmission of electric force, not in doses that can move a needle, but in hundreds and thousands of horse-power, of which Sir W. Thomson and Dr. Siemens have given us such magnificent (though somewhat contradictory) forecasts. Instead of limiting our inquiries into the subject of "Heat, a mode of motion," we shall have to study the relation of vibration to physical condition, or of "motion, a mode of matter," or "matter, a mode of life."

THE STAFF OF LIFE.

ALL persons who lay to heart the welfare of the industrial classes, to say nothing of their own, ought to take interest in that question as to the best mode of bread-making, to which just now public attention is being pointedly directed.

For ourselves, our readers may do us the justice to remember, the subject has not the charm of novelty. The costly waste with which the Wiltshire agricultural peasant lays out the greater part of his weekly earnings in white bread, eaten hot from the oven,—which the Scotch would term "fizzenless,"—has before now been lamented in our pages. It is with great satisfaction that we see earnest attention directed to the subject. The first wish that we have to express in the matter is, that the reformers, with whom we have so much sympathy, should not ride their hobby to death, and throw away the real advantage of their position by claiming further advantages, which may be regarded as only imaginary.

Nothing, we are convinced, stands more in the way of any necessary and well-considered improvement than the excess of zeal on the part of its advocates. We were about to write igno-

rant zeal, but it will be more correct to say zeal partially instructed. A thing may be freshly proved to a certain mind to be an evil; but the probability is, that it has been long known to be, more or less, an evil. The zealous man sets his lance in rest and rushes to the charge. The wise man pauses to inquire how it was that the evil became rampant. Some reason must exist. And it is only by the detection of the *raison d'être* of the evil which it is wished to obviate that any steps that are adequate for the purpose are likely to be taken. Thus, it is not enough to say,—"White bread is costly and less nutritious than brown bread." That is no new discovery. Those persons who wish to utilise it have first to explain to themselves how it is that that costly artificial product,—the baker's loaf,—has established itself as so universal an institution in this part of Great Britain.

The ground taken by recent lecturers on the subject is that of chemical analysis. Of the extraordinary value of that method of putting nature to the torture we should be the last persons to speak with anything approaching to disrespect. The progress of exact knowledge in chemistry we regard as amongst the greatest triumphs yet attained by human genius. But nature must not be examined under torture alone. Especially as to those more subtle of her products which are beyond the direct cognisance of the chemist, must we be content to listen to her unconstrained utterances; at all events, in control of the results of the analyst.

Now, we are told that one shilling's worth of wheat meal bread will form a substantial meal for nine people, and that it contains forty per cent. more nourishment than an equal weight of white bread, which will cost much more. That is a proper subject of investigation; and, moreover, one in which personal experience is not absent to qualify the judgment. But when the lecturer goes on to say that it contains three times more flesh-forming material, seventy times more heat-forming material, and three times more bone-forming material than one shilling's worth of beef, it seems to us that the argument breaks down. It deals with the test-tube and scales instead of with the human stomach and the phenomena of consciousness. Take a working-man exercising the harder kind of labour, that is to say, a public writer, an architect in full work, or a busy barrister, either in the discharge of his daily toil, or when he is seeking new health on a Scotch moor or an Alpine pass. Place before him for breakfast a meal loaf, as good as the Bread Reform League have got to offer, and a pat of butter, with tea or coffee. He asks for a small bit of beef steak or a hot mutton chop, with perhaps a glass of ale. You meet this request with a pamphlet containing statements such as that bit of information about seventy times more heat-giving substance. He says, "As to all that I can say nothing. I know the difference that the little bit of hot meat makes to my comfort all day, and I leave analysis to chemists." Personal experience leads us to sympathise with the working-man in question. And to such, and thus to the great majority of those who influence the less-educated classes, the efforts of the bread-reformers assume a sort of fantastic, unreal aspect from the over-statement arising from relying on chemical analysis alone.

While we wish more power to the elbow of the Bread Reform League, we speak simply in support of the view that English people can, if they will, have much more nutritious bread than they usually eat, at a considerably lower price. We do not, however, think fit to join in a cry against the bakers. It is quite true that, from time to time, the want of conformity between the price of wheat and that of bread attracts angry animadversion, which, after a while, either produces its effect, or from some other reason sinks into silence. Nor do we in any way agree with those who cry out for legislation on the matter. We are of that ancient, unpopular, but robust school which holds that people ought to exhaust the means at their own command before they go to others to help them. In this case of bread, as in most others, it is the consumer who dominates the producer. The consumer elects what bread he will eat, and if the peasant who earns nine shillings a week insists on eating, and on giving his children to eat, the whitest bread that is made, hot out of the oven, with, if he can by any means compass it, a bit of butter spread on the smoking slice, it is not by Act of Parliament that the wasteful and pernicious taste will be eradicated. Neither will it be by lectures. Example will, in such a case, go further than precept. We are not undervaluing the importance of sound chemical knowledge as to the value of food. We think that if the Bread Reform League will study the files of the *Builder*, they will find very much of what is now being announced as new to have been stated very plainly in them. But all means of publicity are good for the purpose. Our annual consumption of wheat is now about 20,500,000 quarters, which is worth on an average some 54,000,000*l*. Of this, 32,000,000*l*. is allotted to home produce, and 22,000,000*l*. to importation. How much of this is lost to human consumption by our eating fine flour bread instead of meal bread, it will be an instructive sum to work out. As between wheaten and oaten bread, the proportion of nourishment is very much greater in the latter. Wheat contains 146 parts of flesh-forming material to 698 parts of carbon, or heat-forming material. Oats yield the proportion of 17 to 664. But beans, be it remembered, yield 240 parts of flesh-forming substance to 577 parts of heat-giving. The value of the bean as an accessory, where rice (with its low proportion of 65 flesh-forming to 795 heat-giving element) is the staple grain, is practically well known in India. And in Southern Italy, where the best white bread in the world is made from the superb Carozelle wheat of the Apulian plains, the peasantry may be said to live for at least two months out of twelve on beans.

It appears to us that for this matter of bread reform an ounce of practice will be worth a pound of theory. The first thing to do is to show that meal bread may be made not only economical, but palatable. The idea of the grinding of the wheat by a steel mill seems to us a very good one; and that the more so because it is not intimated that the inventor of the mill seeks to make undue capital out of his invention. How much of the discomfort produced by some kinds of meal may be due to the local nature of the millstones, is an interesting subject for inquiry. In his well-sung journey to Brindisi, Horace complains of the "stony" character of the bread of Canosa. "*Nam Canusi lapidosus.*" At the present day the traveller over the same route will do well to take care of his teeth. The bread of Canosa is still full of a grit which can hardly be produced by the fine corn of the district. Not that it is necessary to supply from mechanical sources a kind of impurity which is only too much to be regretted in some vegetable grains. In Australia, a plant of the family *Marsileaceæ* covers the ground, in some places, with its little black spores, about the size of sweet-peas. The albuminous matter contained in these spores makes a nutritious food, when properly prepared. As a porridge or stir-about, it is said to be delicious. But the skin of the pores is so irritating to the stomach, that, if it is not carefully removed from the meal, the food, though still palatable, becomes poison. It causes such disturbance in the digestive functions that one of the most famous explorers of that region, the man who first went through Australia from north to south, perished of absolute starvation, though never failing to eat daily meals. He had not the means of removing the husk, and, in the absence of other food, absolutely perished of hunger.

We had written thus far when we read, to our great satisfaction, two letters which have anticipated, in the most accurate manner, the recommendations which we were about to offer to the League. One of them is from Miss Yates, a member of the Ladies' Sanitary Association; the other from Dr. Bartlett, who spoke on the subject at the recent meeting at the Town-hall, Kensington. We were about to suggest that the first step to be taken for the practical furthering of the object in question would be to supply to the public such a sample bread as should avoid the objections raised, as above hinted, at such a price as would allow a living profit to a baker who could command a fair amount of custom. We are told that the Bread Reform League has now a list of nearly 100 shops where the bakers are willing to sell, at the same price as white bread, wheat-meal bread, made from meal ground in a steel mill. This is a step in the right direction. We may observe that, if all said be true, the meal bread ought to be cheaper than the white bread,—but let that alone for the present. Stern and sad experience leads us to caution the committee against relying on "lists of shops." To do justice to an important movement of this nature, it will be necessary that there should be a constant, unobtrusive, vigilant visitation of these shops. Some one fit for the task must look in from time to time and buy a loaf. He will have to note how often the shopkeeper "happens to be out of" meal bread; whether from having "already sold that day's supply," or from some mysterious failure in the mill, or the oven, or part of the machinery in the production. We shall be agreeably surprised if these hitches are not found to be more frequent than was at all anticipated. Next, our suggested visitor must take the pains to take his loaf home, and to eat it, or at least to eat enough to enable him to judge whether it is the real article, or some more lucrative imitation of it. If this be done, and if, with some care to suit the public palate, such meal bread as we know can be made be regularly supplied to the public at the price which accurately corresponds to the cost of production, plus a fair tradesman's profit, there will be a standing ground for the lecturer or the public writer; and we may hope to see the steady but certain introduction of a better and cheaper kind of bread.

THE SANITARY CONDITION OF UPPER-CLASS LODGING-HOUSES.

There can be no question that those who have for years been urging that more attention should be paid to the sanitary condition of our dwellings are at length beginning to see their efforts bearing some fruit. The more intelligent householders are showing some signs of an appreciation of the value of a good sanitary condition of a dwelling, though we fear that it will be a long time before the proper appreciation of this matter is taken hold of by the large mass of the population. There is, however, one class of dwellings which as yet is, it may be said, wholly uninfluenced by sanitary improvements. These are what we have termed in the heading to this article,—upper-class lodging-houses. These lodging-houses are most numerous in our large towns. London contains by far the greatest number, which are inhabited by all kinds of persons,—young noblemen, young barristers, young merchants, and every kind and manner of professional or non-professional person. In the larger towns, such as Liverpool and Manchester, they are chiefly occupied by young men engaged in the business of the place. And we venture to affirm, without fear of contradiction, that an examination of the numberless houses used as lodging-houses would show them to be in a very backward sanitary state. Can this be wondered at when the matter is considered for a moment? The ordinary lodging-house keeper is, no doubt, a very respectable person. In the best class of London lodging-houses the proprietor is usually a retired domestic servant, very respectful and civil, with no mean idea of the desirability of comfort, with a dislike of ventilation, and absolutely ignorant of the value of a good healthy house. In the large towns in England the proprietor is less often an old domestic servant; he is very often,—if a man,—a clerk, or is engaged in some lower kind of business occupation, whilst his wife attends to the house. But, again, he is a person with small appreciation of the necessity of a healthy house. In London most of the proprietors hold their houses on seven, fourteen, or twenty-one years' leases, and under the usual London system,—one which sets a premium on doing as little as possible to make a house healthy,—the tenant must bear the cost of any improvements which he makes. The natural consequence is, that in addition to ignorance of sanitary matters, there also exists a desire not to spend money upon anything which shall in any way diminish the profits to be taken from lodgers. This is perfectly natural. Lodging-house keepers work hard and do not make much money. They have rent, wages, and other expenses to provide for, and may not always obtain the tenants to pay for the outgoings, or to bring in the margin of profit. They are under fear of no authority to rummage into their pipes or drains or closets. The tenants, taken as a whole, consist of young men who have not yet given much thought about sanitary matters. As long as the cooking is fair, the rooms pretty warm in winter, and not overpoweringly hot in summer, they are content with their quarters. The larger portion of the day is spent in some other place, and it is

the evenings and nights which see them mostly at home. If sewer-air happens to make its way into their rooms and causes them to feel ill in consequence, they will say they are "seedy"; will lay it down to a hot theatre, bad wine, or some cause quite different from the true one; and if healthy and strong, will very likely throw off the sickness. In many cases, too, the lodgers remain no very long time in the house; if they find the smells disagreeable they perhaps change, and change in all probability from Scylla to Charybdis. And so the time goes on, and the drainage and ventilation remain unimproved and a constant source of danger to the inmates of the house.

If we take, for example, an ordinary good lodging-house in Liverpool which possesses a bath-room, we shall in most cases find that a water-closet is in the bath-room, or, if it is not, that the waste-pipes of the bath directly communicate with the soil-pipe. This is only one instance of an unwholesome condition of a house, which is liable to breed disease and consequent illness. If we penetrate into the lower regions we shall find sinks, and drains, and traps which would set the mind of a sanitary reformer a-thinking on the uselessness of his endeavours. And all these defective drainage arrangements are the more dangerous in lodging-houses, because, as a rule, they are not counteracted by the open windows, good fires, open chimneys when no fires are burning, and general cleanliness, which a lady who is mistress of a house takes care to see exist. It must, in fact, be a matter of almost common knowledge to an observant man that the sanitary condition of lodging-houses is not what it should be. And let it be remembered that we are now treating not of lodging-houses for workmen, but of lodging-houses for the upper classes, who are, as a rule, engaged in some business or profession, and who, generally, are part of the rising generation of Englishmen, and we much doubt whether any improvement can be looked for for a long time. There is one reform which might do something, but which would be much opposed. That reform is the inspection of every lodging-house in a town by a competent inspector. The ordinary Englishman hates anything like inspection; the inspector is a man to be abhorred, and we feel quite certain that any such reform would be greatly opposed. It would be opposed both by lessors and lessees or yearly tenants. It would be wholly unfair to make tenants (we are putting lodgers now aside for the moment) pay the cost of structural repairs, such as new drainage, alteration of sinks and closets, and ventilation of drains, and in London the ordinary landlord will not, if he can help it, do anything for a tenant. Therefore, to make any such reform just, it would be necessary to make the cost of such repairs a burden upon the landlord,—at any rate, to some extent; and, therefore, as we say, there would be two classes in opposition to such a reform. That any change for the better can for long years take place without a compulsory inspection of lodging-houses from time to time, we feel sure cannot be expected even by the most sanguine reformer; and, at the same time, there can be no question that the sanitary condition of upper-class lodging-houses is a subject which deserves very careful consideration, to settle the measures which should be taken to improve such condition.

THE CAFÉS OF MUNICH.

WHATEVER may be said for or against the views of a great part of the public with regard to the question of temperance, there can be no doubt that the movement in favour of what has been called coffee-taverns is exceedingly active, and to a very large portion of the population of our great cities these coffee-taverns must have come to supply a long-felt want; it is not too much to say that we may view them as one of the most beneficial of our adaptations from foreign ways. In the case of our coffee-taverns, adaptations they certainly can only be termed, for they differ singularly both from the ideal and the reality of the foreign *café*. But there are *cafés* and *cafés*, as any one familiar with the Continent knows, and the full-blown *café* of the Paris boulevard, the now adopted model of such institutions throughout the world, differs as strangely from the characteristic and dark little *caffè* of a Venetian bye-street as must the seventeenth-century Grecian Coffee-house in Devereux-court,—whose model, by the way, would be taken from this latter,—from the most recently-built *café* in the Avenue de l'Opéra.

The *café* is an institution which takes in the life of the Continental far more the place of the English club than is usually supposed, and he begins his acquaintance with its pleasures at an age when the club is, for ten years at least, shut to the Englishman. It is no new theory that it is in great part owing to this early training that the Continental acquires that familiarity with life and the world, and ease in manner, which in the present day are more than ever considered essential. The ways and habits of the mug-house must infallibly give way, and the coffee-tavern, it is not unjustly hoped, will tend greatly to aid in refining the habits of a large number of the inhabitants of our cities. In foreign *cafés*, side by side with the most ceremonious and formal of military martinets, the most punctilious and severe priestly or scholarly manners, will be seen the free-mannered *bourgeois*, the comfortable *boursier*, the radiant student, or the humble shopkeeper.

The *cafés* of all foreign towns offer their peculiar features of interest, and as such have always afforded writers gifted with the happy power of "touching off character" ample field for the exercise of their peculiar abilities. One may be excused, therefore, in writing from Munich, in feeling that the *cafés* of the Bavarian capital offer some character by which they merit notice; their peculiar comfort, and the exceptionally generous consideration to what might be termed the literary accommodation, form a feature which, at a moment when there is a movement in favour of the spread of the consumption of coffee at home, is particularly worth note. When these same *cafés* assume the proportions of important architectural features of the city,—features in the decoration of which the wealth of the capitalist has been expended in the employment of art which falls little short of the art of the best days of decorative painting,—they present another claim to our notice.

The subject is not an uninteresting one to treat, as all who have visited Bavaria will concede that not least among the impressions they may have borne away, even of a short stay in King Louis's capital, was that connected with the numerous *cafés* scattered over the town. With the thorough-paced Parisian *café* we have all long since become familiar; nor is it, perhaps, going too far to say that with an increasing amount of familiarity has come its proverbial accompaniment. The Parisian *café* has ceased to be what it was; it has ceased, in fact, to be a *café*, and since it has lost this great feature it no longer possesses the charm that made it in the past the resort of the choice spirits of letters and of art; nor has the Parisian *café* any longer that fascination for the stranger,—we speak from an English point of view,—that once prevailed. In Munich the traditions still exist of the old days of the *cafés*. There we find much of the old comfort, and that absence of the too-clearly-expressed modern feeling of one's room being worth more than one's company; there one is induced, and, indeed, invited, to stay, by the accommodation afforded, by the smallness of the outlay, by a welcome from the proprietor or proprietors,—no syren-like *dame du comptoir*,—and by what appeals to the Anglo-Saxon peculiarly, a large supply of journals; German (of which there are several dozen ranged round the room) and foreign, always an English daily paper to tell one of the doings at home; the *Illustrated London News*, or its equally popular sister, and the ever-familiar face of Dicky Doyle's dear old *Punch* and his dumb companion, with all the picture papers from Leipzig, from Vienna, and from Paris, while further amusement is supplied by billiards, and cards, and chess, which replace in Germany the fast-dying science of dominoes in the Paris *cafés*, and, what is by no means the least uninteresting or unpleasant feature of all, a service of bright, intelligent, almost, perhaps, too well-looking girls, whose rapid movements and attention to the wants of the frequenters are a constant source of delight to the stranger, as well as evidently of amusement and pleasure to the native *habitués*.

Most of the *cafés* at Munich, and there are not a few, are arranged on this principle, though, as may be imagined, throughout the town the age of the different establishments affects not a little the interior style and decoration, but each as the date approaches more nearly the present day is more gorgeously decorated than the last. Among the more recently built no restriction seems to have been placed on the architect in his design, exteriorly and interiorly. It would seem as if we were indulging in an extravagant dream of splendour were we to describe fully one of the most recently completed of these establishments, for here is employed the largest and noblest style of modern Italian architecture in solid stone-work, enriched interiorly with carving and gold, and the walls and ceilings of the rooms are adorned with highly decorative paintings, executed by artists who are all but famous in the history of modern art.

It is not a little characteristic, and a point to which perhaps till now we have not drawn sufficient attention, that in each and all of these establishments, coffee, the genuine extract, not a decoction of the Mocha berry, is supplied at an excessively modest rate (2½d.), and forms the speciality, the only deviation from this rule consisting in the very small consumption of mild liqueurs in the regulation liqueur-glass. It is easy to trace the influence of Venetia in the large glass of pure water,—drawn from the continually flowing fountain in the middle of the room,—which is immediately brought one on entering, though it is more German to have supplied at all hours of the day coffee with milk in it, together with the three regulation lumps of sugar in lieu of the little cup of *caffè nero*, and the measure of pounded sugar, of Italy.

In many parts of the world there must be artists, especially musicians, architects, painters and sculptors, and decorators of all kinds, literary men and scholars, and teachers in many ways, who look back to the pleasant hours they have passed in the *cafés* of Munich with affectionate interest; and how often must even the casual visitor to this part of the world remember the courteous welcome that is always so liberally given both by the host and hostess. Whatever may be the system by which these establishments are made profitable investments (and this is difficult to understand), it is quite certain that they are capable of affording to any observant person an admirable lesson of the advantages to be derived from the strictest economy in every detail of their management, and the most careful desire to supply the clients with the utmost possible return for their outlay.

EATON HALL.

WE publish in our present number a double-page illustration of Eaton Hall, near Chester, the seat of his Grace the Duke of Westminster, and a plan of the ground floor. Our view is taken from the south-west, and includes the main building and the chapel. The illustration sufficiently sets forth the character of as much of the exterior as it comprises, the style being Early Pointed, freely treated. We shall, however, call attention to some of the features on the east of the garden front. On this side of the house is the Grosvenor wing, containing the suite of family apartments, connected with the main building at the north-east angle by a vaulted corridor over a bridge. Between the Grosvenor wing and the main building stands the north wing, which sets back, and is lower than either, forming an important connecting-link in the general view. Behind the north wing rise the clock-tower and the chapel-turret, so that from certain points of view in the garden the Grosvenor wing stands as a central feature; on its right the main building, while on its left the stables and other inferior parts of this immense establishment stretch into the woods for a considerable distance, the chapel-tower forming, even from this side, the culminating feature.

The main entrance is by the *porte cochère*, which forms a conspicuous feature in our engraving, and which leads, by a flight of steps, and beneath a lofty doorway of alabaster, into the hall. This consists of a large square apartment, 32 ft. by 32 ft., extending through two stories of the building, with lateral extensions towards the north and south, which are only separated from it by two large arches, and are but one story in height. A double arcade at the further or eastern end leads to the saloon. The floor of the hall is a sumptuous one, of "opus Alexandrinum," in an elaborate arrangement of porphyry, serpentine, *giallo antico*, and Parian marbles.

The ceiling is of panelled wainscot, and the lower part of the walls is lined with

alabaster and Genoa green marble, while seats of red granite are ranged between the arches and the east and west walls on either side, and cover the arrangements for heating the apartment. The chimneypieces are principally of alabaster; that in the northern bay has a long sculptured panel, in the centre of which King Richard II. is represented delivering his famous judgment as to the right of Scrope or Grosvenor to bear the arms *azure*, a bend *or*. The *personæ* on either hand of the king are all of historic interest, and are recognisable by their semblance to known authorities, or by their armorial bearings, amongst them being John of Gaunt (the king's uncle), Geoffrey Chaucer, Hotspur, the clergy and notables of Cheshire, &c. The chimneypiece in the northern extension has a similar sculptured panel. In the centre is King William I. bestowing the sword of Chester upon Hugh Lupus, the present duke's namesake and ancestor; the groups on either hand displaying family or local incidents of historic importance.

The grand corridor, which passes between the eastern end of the hall and the saloon, leads towards the south to the great drawing-room and the library, and northward stretches right away, though diminished in width, throughout the whole length of the building to the cross corridor, connecting the chapel with the bridge which leads to the Grosvenor wing. The northern portion has a groined ceiling.

The library occupies nearly the whole of the south front, and is 90 ft. by 30 ft. It has a deep bay in the ground-story of the tower, which is conspicuous in our view, and two large bay-windows, which are also to be seen in the engraving. Two angle bays at the west end further diversify the plan. It is fitted with walnut. At the east end stands the organ, in a richly-carved case, and the bookcases extend round the walls of the room. The various panels, friezes, and cornices are brilliant with inlay of mother-of-pearl and boxwood. The chimney-pieces are on the north side, and are of walnut, and they are enriched with carving and the inlay of pearl and box. The upper portions of them project, and are supported by caryatides representing the relation of all ranks to a library,—royalty, the church, chivalry, minstrelsy, husbandry, &c., being represented. The hexagonal panel in the centre contains in the one a clock and in the other an anemometer. The ceiling consists of walnut-cased beams and plaster panels, highly enriched with foliage, &c. The windows will be filled with heraldic stained glass. Over the entrance to the library is the "Caxton Memorial" which was illustrated in our volume for 1877, p. 687. The floor is to be of oak parquet.

The great drawing-room, 45 ft. by 36 ft., communicates with the grand corridor on the west, the garden, porch, lobby, and library on the south, and ante-room on the north. At the east it has one large recess, in which we understand will be placed Mr. Thornycroft's "Artemis," exhibited this year in the Royal Academy. The old plaster groined ceiling is retained, with certain modifications, and has been re-decorated. The chimneypiece is one of various marbles, purchased by the Duke while in Italy.

The ante-drawing-room adjoining has also its old ceiling, which has been decorated afresh. This room will be celebrated for its twelve panels of birds painted by Mr. H. S. Marks, R.A. The saloon has a high wainscot dado, and the walls above are painted also by Marks, illustrating the "Canterbury Pilgrims." The chimneypiece is of alabaster, and the central panel contains a procession of world-famous lovers, from Antony and Cleopatra to Raffaelle and the Fornarina. The smaller panels in this and the other chimneypieces before described contain allegorical figures, which have all some reference to the principal subjects, *e.g.*, Truth, Valour, Constancy, Love, &c. The ceiling is groined, and of wainscot. It is of very elaborate design, and is to be decorated with colours and gilding.

We now come to the ante-dining-room, with its walnut dado, in the panels of which family portraits by Gainsborough, Millais, &c., are framed. As in the drawing-room, the old plaster ceiling is retained, and has been re-decorated.

The great dining-room is of the same shape and size as the drawing-room. It is being fitted up with all-becoming magnificence in walnut. At the north end is the sideboard recess, which has a groined walnut ceiling, and a serving-room adjoins. To the west of the dining-room, and on either side of the corridor, are the billiard and smoking rooms. They are treated similarly, and have wainscoted dados, with dark oak panels. The ceilings are also of wainscot, and the walls are hung with stamped leather. The floors are of parquet.

The grand staircase is enclosed in walls of Grinshill stone, with bands of Robin Hood and Forest of Dean. The steps are of Portland, and the balustrade of alabaster, carried on small shafts of various granites, in pairs. The ceiling is of oak, and is supported by massively-framed principals, filled in with tracery. At the second-floor level a bridge is thrown across for the use of the servants. The corridors in the east side are glazed with tinted quarry glass, and those on the west side with clear plate, so as to command a view of the park and the Welsh mountains. This staircase leads to the state apartments, which are on the first floor.

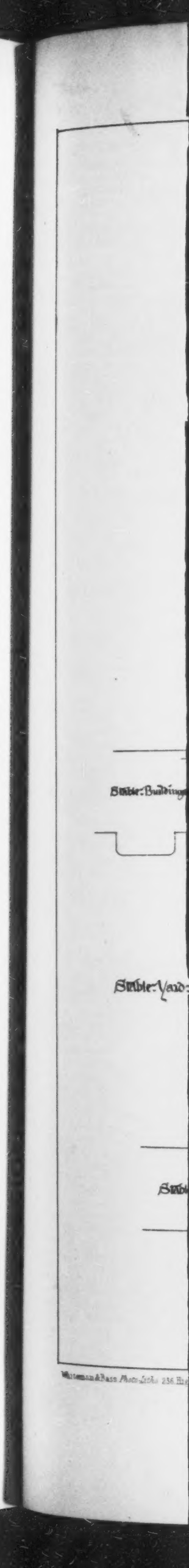
We have now described the principal apartments in the main building, and proceed to the north wing, the Grosvenor wing, the stables, &c.

In the north wing is the magnificent kitchen, lined with terra cotta, and a groined ceiling filled in with the same material. The Grosvenor wing is in itself a large house, and much space might be occupied with a description of it. It has a central hall, round which the principal apartments are ranged, and which is lighted by a centre light. From this hall, the principal staircase rises, and at the first-floor level a gallery is carried round it which gives access to the various rooms. The floor is of coloured mosaic, and the ceiling is decorated with heraldry. The apartments on the ground-floor generally have parquet floors and wainscot fittings and dados, and ceilings of plaster panelling in geometric patterns, enriched with colour. The duchess's room is panelled with views of Cliveden, Trentham, and Dunrobin, by O'Connor. The chapel was fully described in this journal in 1879, when an illustration of the exterior of it was given (p. 888). The stables, which in many respects are as well worth a visit as anything at Eaton, stretch away further still to the north, and are arranged round a large court-yard, in the middle of which is an ornamental basin with a central equestrian group, by Mr. J. E. Boehm, A.R.A. Beyond the stables are the coachmen's cottages, and the establishment is completed by the gas-house, water-works, and laundry, still further away by the side of the Dee. Large tanks in the library and chapel towers (the latter in reserve) supply water for the hydraulic lifts and in case of fire. On the west side of the house is the Belgrave Avenue, which is about two miles long, and on the east side the corridors of the grand suite of entertaining-rooms command an extensive view of the terraces, the river Dee, and in the distance the Peckferton Hills and Boston Castle.

SCIENTIFIC AND ARTISTIC ASPECTS OF POTTERY AND PORCELAIN.*

The third of Professor Church's series of Cantor Lectures on "Some Points of Contact between the Scientific and Artistic Aspects of Pottery and Porcelain," was delivered on Monday evening last, when the division of the subject dealt with was "Stoneware and other Wares glazed with Salt." The lecturer said that the stonewares to which he wished more particularly to allude were those which had been chiefly made in Germany and in Staffordshire, and at Lambeth and Fulham, and which were for the most part glazed with salt. With regard to the body, or paste, of these wares, it might be said generally that stoneware led up from earthenware, through the beautiful jasper ware of Wedgwood, to hard porcelain. What was the structure of the ordinary stoneware and of the jasper ware first of all made,—and, indeed, invented,—by Wedgwood? It was essentially a fire-clay or china-clay, made less plastic, or less greasy, as the French would say, by the addition of silica in some form or other, generally in the form of fine sand or ground flint, which took away to a great extent its "soapy" feel when it was moist, and gave it a greater degree of hardness when fired in the kiln. At the same time, however, the addition of silicious material to the clay imparted a certain degree of brittleness, which, in so far as it went, was one drawback of stoneware. At the same time, the addition of silica imparted to the product a peculiar and characteristic property which stoneware did not share with any other kind of pottery. If a piece of stoneware were examined under the microscope, it would be seen to consist, first of all, of a great mass of small particles of clay, not very much altered by firing; and the six-sided outlines of the crystalline fragments of the mineral which formed the chief constituent of the clay, and the little angular fragments of the sand or flint, could be seen. But there was something which held all these fragments and particles together, viz., the glassy material which was formed at a high temperature in the kiln by the action of a minute quantity of alkaline matter which existed in the clay and united with the silica, forming a hard silicate of potash or soda, and lime. The lecturer then entered into the subject of clay analyses, pointing out that Stourbridge fire-clay, which contained only ½ per cent. of alkaline matter, was the least fusible of all clays, and hence its practical value in the industrial arts. Watcombe clay contained about 7 per cent. of alkaline matter, and Poole or Dorset clay 4 per cent. All clays were not equally adapted for stoneware, those with the larger percentages of alkaline matter being too fusible. The contraction of the clay in the kiln was a very serious matter, various clays contracting in very different degrees. In the Jermyn-street Museum there would be found a beautiful series of specimens of the different clays, arranged geologically, which could be used for potting purposes, each clay being represented by experimental slabs of the same size burnt and unburnt, so as to show the amount of contraction. Mr. George Moore, who made the experiments, presented the specimens to the Museum of Practical Geology, and had contributed to the catalogue of the pottery exhibited there an elaborate series of tables showing the results he arrived at. Stourbridge clay would contract only from 1 to 2 per cent., while other clays would contract from 18 to 20 per cent., or about one-fifth of their whole bulk. As to the progress of the manufacture of the body of stoneware in this country, the lecturer observed that Simeon Shaw, whose valuable book,—not to be trusted in every particular,—was published in 1829, said that at first the Staffordshire potters used a mixture (for stoneware glazed with salt) of brick, clay, and sand. They subsequently used a clayey marl and a grey clay from the coal measures mixed with clean sand. Shaw stated that to each bushel of salt thrown into the kiln for glazing, some manufacturers added one pint of red lead. Another manufacturer effected an improvement in the body of the ware by introducing ground flint into the clay, and his successor introduced another improvement by thoroughly washing the clay to get rid of ochreous and other matter. Wedgwood, in making the body of his jasper ware, instead of mixing sand with his pipe-clay and china-clay, used sulphate of baryta (heavy spar), which was opaque, or nearly so, when finely ground. There was a great deal of difference in the Wedgwood ware made during Josiah Wedgwood's lifetime and that made subsequently, and any one studying the porous open texture of the body of modern Wedgwood ware must, he thought, attribute it to the less careful uniformity in the grinding of the materials. Referring to some stoneware jugs exhibited, the lecturer said they presented some peculiarities which would at first sight lead one to suppose that they were English. They were globular in form, with straight necks, and were well potted and glazed with salt. They generally bore as a monogram either "G. R." or "A. R.," and, more rarely, "W. R.," but they all bore indications of being of an earlier period than that of George I. Many persons had accepted the notion that "G. R." stood for "Gulielmus Rex," and that the jugs were really of the time of William and Mary. The specimens exhibited were not, he thought, English, but were, no doubt, made for the English market about the end of the seventeenth century. Similar jugs, but inferior in material, shape, and finish, were made by Dwight, of Fulham, about the same time. As to "Bellarmines," some of them made at Fulham by Dwight were as good as any made in this country. Having referred to the development of stoneware in Staffordshire (where he believed it was no longer produced), the lecturer referred to Continental productions, and finally referred to modern stoneware as produced by Messrs. Doulton and Messrs. Stiff at Lambeth.

* See *Builder*, p. 654, *ante*.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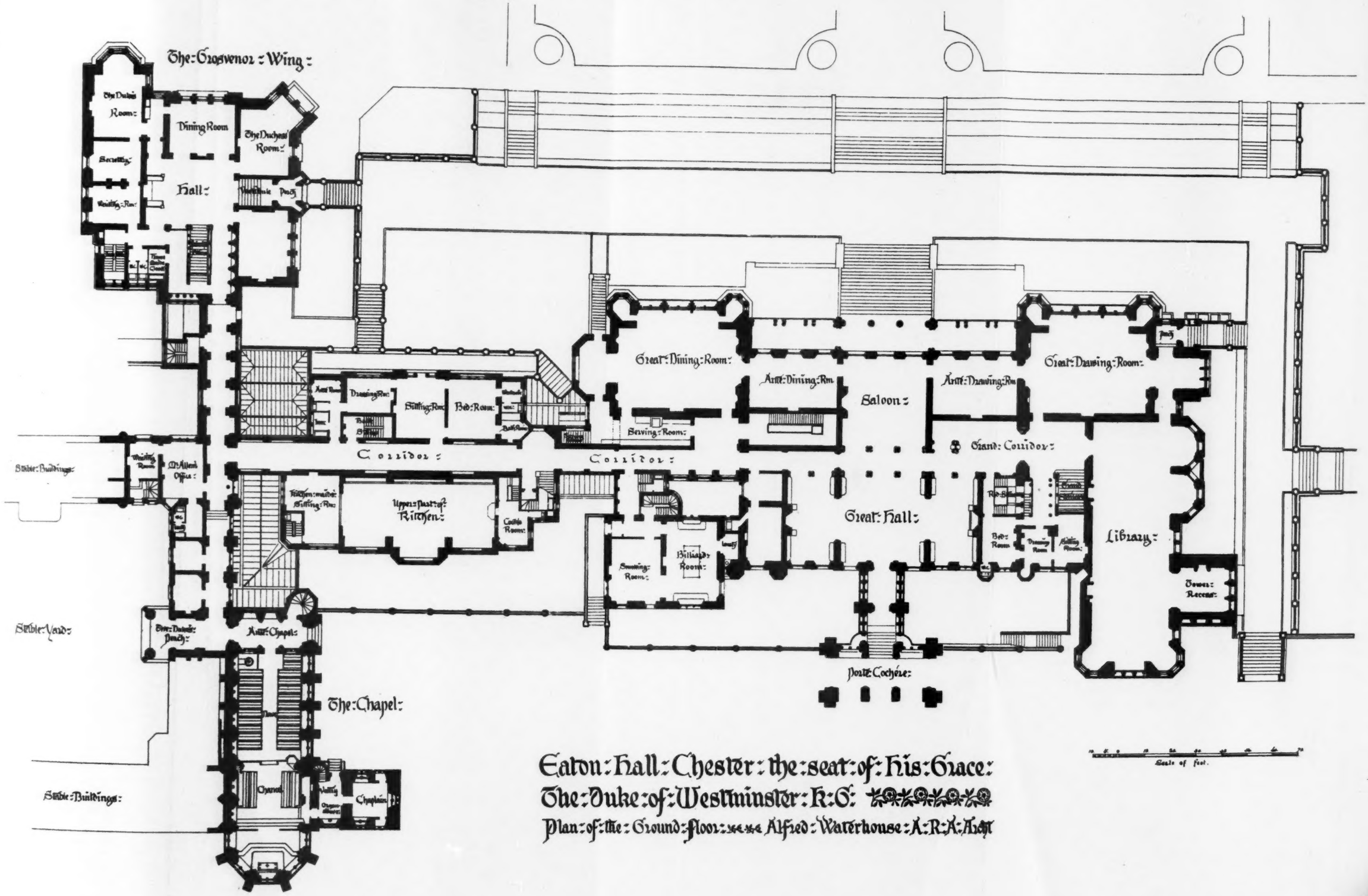
EATON HALL, CHESTER.—Mr. Alfred Waterhouse, A.R.A., Architect.



Eaton Hall, Chester, the seat of His Grace The Duke of Westminster, K.G.

Plan of the Ground Floor. Alfred Waterhouse, A.R.A. Archt

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ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association on Friday, the 3rd inst., Mr. Ernest C. Lee, president, in the chair, about thirty gentlemen were nominated for election as members.

Mr. R. Phené Spiers said:—I desire, by leave of the meeting, to say a few words as to

The Origin of the Architectural Association.

The precise date of the origin of the Architectural Association has so often been mooted in committee when a new "Brown Book" was being collated, that I have thought the matter sufficiently interesting to note down a few facts concerning it, especially as it was alluded to in the President's address this year, and as I am able to present the Association with what may be called the first "Brown Book" in existence. The society from which the Association sprang was called the "Association of Architectural Draughtsman." It was instituted on the 1st of September, 1842, and its objects, five in number, are set forth in the prospectus attached hereto. In this paper the rooms are stated to be at 33, Southampton-street, Strand. In the *Builder* of July 15, 1843, however, a notice is given of the society, wherein it states that the members meet on the first and third Wednesday in every month at the *Café Royal*, 42, Castle-street, Holborn; and a letter to the editor of that paper from Mr. J. K. Colling, who appears to have been one of the most active members of the society, states,—

"Sir,—It may not be known to you that a society exists called the British Association of Architectural Draughtsmen, having for its object, by union and co-operation, the providing with employment those of its members who may require it. For this purpose a register is kept of those unemployed, and which is available to architects who require assistants; also, each member of the society furnishes quarterly a drawing of some executed architectural subject, which drawings are kept in the portfolio of the society, and not only form the means of collecting vast professional information, but a sure guide to architects by which to judge of the ability of the assistants they may select. Connected with the society we have also established a benevolent fund, for assisting those of our body who, through misfortune or ill-health, may require it."

Mr. Colling then goes on to say that he has much pleasure in forwarding a drawing for publication, and hopes to be able to supply others. This drawing, of the chancel-window of the church at Little Maplestead, was published,* being, however, the first and last of the series. On the 2nd of September in the same year some one writes to the *Builder* to suggest a more extended plan, and asks why original drawings should not also be sent in. Nothing more is heard of the society till February 3rd, 1847, when Professor (then Mr.) Kerr, reads a paper on "Architectural Education" at the rooms in Southampton-street, Strand. This paper was a very important one, and led to the immediate formation of the Architectural Association, which sprang phœnix-like out of the embers of the decaying Association of Architectural Draughtsmen. The next notice I find in the *Fine Arts Journal*, in which it appears that a meeting was held on the 3rd of March, to put into operation one of Mr. Kerr's proposals, viz., to embody "a school of design," and it was then stated that the object of Mr. Kerr's paper, and from which this scheme (the formation of a school of design) emanated, was to form a society upon an enlarged scale, with a comparatively trifling subscription, which would induce every student of the art to avail himself of its privileges. Some amended rules were read out and approved of, and a number of new names were proposed for membership. A sub-committee of the old society was then appointed to meet a deputation of the newly-proposed members, and to arrange at once upon the actual working of the new schools. The next notice is on the 5th of May of the same year, when a paper was read by Mr. Colling before the already-formed society, still meeting in Southampton-street. On the 7th of July, 1847, a paper on "Architectural Style" was read by Mr. Kerr, who had been elected president; and on October 8th, the first *conversazione* was held at the new rooms in Lyon's Inn Hall, at which over a hundred persons were present, when the president, Mr. Kerr, delivered his opening address.† It then numbered eighty new members. The Association remained there till April, 1859, when it removed to its present quarters in Conduit-street.

* See *Builder*, vol. i. (1843), p. 275.

† A report of the speeches will be found in the *Builder* of that year. The assistance rendered by the *Builder* in the formation of the Association has been referred to more than once.

The following is a copy of the prospectus of the Association of Architectural Draughtsmen (instituted on the 1st of September, 1842):—

"This Association has for its chief object facility of communication between its members and all others of the architectural profession. The means employed to effect this, and no less the advancement of members in their art, are,—

I. The establishment of a registry of draughtsmen unemployed, and of architects requiring their assistance.

It is needless to dilate upon the advantages of this compared with any system which either makes a profit upon the remuneration of the draughtsman or depresses it without benefit to the architect.

II. The collection of drawings of existing subjects (by quarterly subscription), the first of which returns to the contributor's possession upon the production of the ninth, and so on in the order of contribution.

The drawings are open to public inspection on the undermentioned evenings of meeting, and serve the architect in forming his judgment upon the abilities of the member with whom he contemplates engagement.

III. Publication, in lithography, of such of the drawings as are suitable, each member being entitled to a copy of all published during his membership.

IV. Meetings held on the first and third Wednesday evenings in each month throughout the year, for the purposes of conversation and reading of papers upon professional topics.

V. A Book Club, for the purchase and circulation of professional works.

It should be observed that the Association has formed the nucleus of a benevolent fund, an object deserving of the liberal consideration of the wealthier members of the profession. Subscription to this is optional with members of the Association.

The Association commemorates the anniversary of its formation by a dinner to the town members at Freemasons' Tavern.

Members of the profession are respectfully invited to visit the meetings. Those intending to join are requested to communicate with the secretary at the rooms of the Association, 33, Southampton-street, Strand.

E. C. SAYER, Hon. Sec."

[*Copy of Card.*]

"ASSOCIATION OF ARCHITECTURAL DRAUGHTSMEN,
33, Southampton-street, Strand.

This Association facilitates communication between architects requiring assistance, and draughtsmen unemployed; either in permanent or temporary engagements, it offers advantages peculiar to itself.

It abstains from all interference with or profit upon the terms, so that the architect derives the full benefit of their amount, in receiving the best assistance they can command.

Its regulations are calculated to secure in its members respectability of conduct as well as to improve their talents. Quarterly drawings are required of them, which remain with the Association, and are open to professional inspection on the evenings of the first and third Wednesdays of each month throughout the year.

Note.—If no member should be disengaged who is qualified to answer any application for assistance made to the secretary, the Association will advertise for it, thereby saving the architect expense and trouble.

Communications, &c., addressed to the secretary, at the rooms of the Association, 33, Southampton-street, Strand, will receive prompt attention.

E. C. SAYER, Hon. Sec."

Thanks having been given to Mr. Spiers for his communication,

Mr. W. Hilton Nash read a paper on "The Architects of the Italian Renaissance." This we print elsewhere.

Mr. H. L. Florence, in proposing a vote of thanks to Mr. Nash for his paper, said that the examples which had been mentioned in it were certainly typical of the schools treated of, but the author had not given any particulars of the distinguishing characteristics of those schools. Now, those who had seen the buildings in question would have understood the reasons which gave to each style its peculiarities and the characteristics of the artist himself, because many of the buildings referred to were not by architects alone,—and the circumstance that they were by men who were designers in other arts, painters and sculptors,—materially influenced some of the buildings. With regard to Michelangelo, many of his works, especially the Farnese Palace, were well worthy of study, but they exemplified much that had better be avoided than copied. Of course, the great ideas which he had, such as were realised in his domes and other structures, were to be admired, but the admiration could not be extended to the details of execution.

Mr. Hugh Stannus, in seconding the motion, observed that Mr. Nash had incidentally referred in his paper to the varying conditions under which architecture was practised. He had spoken of the princely patronage that the old architects received during the two centuries dealt with in the paper, and had by implication suggested that the architects of the present day lacked the princely pay, and that therefore they were not able to do such good things. He (Mr. Stannus), however, did not think that architects had any reason to complain of, either as to the patronage or pay accorded to them in the present day. There were princely patrons now as there were of old time, and the remuneration of architects was reasonably good. In his opinion, one great reason why the architecture of the present time could not compare with that of some previous epochs was that the architects themselves were so greedy that they took too many jobs, and some of them, when occasion offered, sought to obtain and did obtain important works in styles in which they were not reputed to excel. So far from seeking work in a style alien to that in which they worked, the older men would have refused it when offered to them; and any one who read the pages of Vasari would find that there were not wanting instances in which architects of established reputation showed a considerate feeling for the younger men. At the present time the younger men in the architectural profession were starving, while all the pluralists, who would take any number of commissions that they could not possibly attend to, flourished. The reason why modern architecture could not compare with the old work was simply that modern architects themselves could not compare with the architects of old. With regard to Raffaelle, Michelangelo, and Leonardo da Vinci, he thought it was to be just as much regretted that they had ever laid their hands upon architecture as it was to be regretted that Sir Christopher Wren had been called upon to build the towers of Westminster Abbey. Raffaelle, Michelangelo, and Leonardo da Vinci did not understand architecture, and thought it consisted in sticking columns and pilasters on to building. Mr. Nash had not alluded to what Sir Charles Barry did at the College of Surgeons in Lincoln's Inn Fields. There was to be seen a façade without an order, and it was one of the finest façades in London. His façade of the Travellers' Club was also very good. With regard to Palladio, architects ought to be grateful to him, not for what he built, but for his book. His buildings were very bad, and in many points of grammar would not be at all creditable to one of the Association's students in the Class of Design. The great debt of gratitude which architects owed to Palladio was for the publication of his book,—a book which had done more, perhaps, than any other to popularise and to systematise the study of architecture.

Mr. R. Phené Spiers said that Mr. Nash had appeared to regard it as a misfortune that the present generation possessed no painters of distinction, nor, indeed, any painters at all, who had carried out architectural works. But in his (Mr. Spiers's) opinion, if we in the present generation found ourselves placed in the same position as the people of Italy in the fifteenth century, there were several of our most distinguished painters who would be called upon, by reason of their talents and position, to design important buildings, just as painters and sculptors were called upon at one time to design buildings in Italy. The President of the Royal Academy (Sir Frederick Leighton) had perhaps a greater knowledge of Greek architecture (so far as its general artistic spirit as distinguished, perhaps, from its practical conditions, was concerned) than any architect now living; and no one could vie with Mr. Alma Tadema in his knowledge of Roman and Pompeian work. There was not the least doubt that if Mr. Alma Tadema were to be called upon to design buildings of that character, he would produce works of great beauty and merit. There were, he need not say, several instances of men who had begun life as architects, and afterwards turned to painting, as, for example, Mr. W. W. Deane, who was a distinguished member of the Society of Painters in Water-Colours, generally giving his attention, however, to architectural subjects. It was said that he was what was called a "disappointed" architect. He was one of the best designers of his day, and used to colour drawings for other architects. His original designs were such as would have brought him credit and honour had they been put into execution, but he could get no practice, and therefore left the profession. There was undoubtedly a very large number of young men who had abilities fitting them to be excellent architects, who joined the ranks of the painters. If they had seen any chance of getting a practice, they would have become architects. It would therefore probably be an easy thing to find several painters who would be capable of becoming excellent architects. Of course it should not be forgotten that many of the distinguished masters of the Italian school were not only great painters and sculptors, but great mathematicians and men of science. Leonardo da Vinci was an example of this in Italy, while in England we had Sir Christopher Wren, who at a very early age made an import-

ant astronomical discovery, and at the age of twenty-five was Professor of Astronomy at Oxford. He afterwards travelled in Italy, and later on produced the wonderfully-varied and numerous spires and towers of the London churches. Many of the distinguished architects of Italy devoted some years at the outset of their career to the study of mathematics and science. They then turned their attention to art, practising the drawing of the figure and probably modelling their figures before painting them,—a practice followed in the present day by Sir Frederick Leighton. Later on, when they had made their reputation either as painters or sculptors, they were called upon to carry out buildings. Such a system of training for architects, however, was impossible under present-day conditions, and any one who allowed himself to reach the age of forty before he took up architecture, would be unable to make himself acquainted with all the details of modern practice. Nearly all the chief architects of France had to go through, in their early training, severe mathematical courses, and if, having entered the École des Beaux Arts, they obtained the Grand Prix, they went to Rome, returning at the age of from thirty-two to thirty-five, without having acquired any practical knowledge as to the strength or properties of materials, or as to the details of construction. If appointed to some public or Government building, their practical knowledge was so deficient that they had to trust almost entirely to their inspectors. Some of them, it was true, had the courage, at that time of life, to turn their attention to the study of the nature and properties of building materials, but others confined their thoughts entirely to design. In England we had no architect who would be content to take the extraordinary position which the late M. Duc occupied for so long with respect to the Palais de Justice, to which building he devoted the whole of his architectural life. Of course, under such circumstances an architect was able to give more thought and care to his building, but it was not, he thought, a system which would find favour in England.

Mr. Nash having briefly replied, the proceedings terminated.

THE ARCHITECTS OF THE ITALIAN RENAISSANCE.*

It is almost impossible, within the limits of a short paper, to do justice to the number of illustrious names which crowd upon us at this epoch, and we can, therefore, only dwell briefly on the lives of the architects of the fifteenth and sixteenth centuries, and the motives which actuated these men to produce works which daily increase in interest, and compel us to offer our tribute of respect to the energy of mind and purity of thought as exhibited in them. Although many may take exception to the over-elaboration of detail, and to the naturalistic treatment of ornament in Late Renaissance works, yet we may discover in nearly all instances a freedom of design which, in earlier times, and especially during the Middle Ages, was often cramped and fettered by ideas which emanated from the seclusion of the cloister and the austerity of monastic life.

The architecture of the Italian Renaissance may be roughly divided into four schools,—the Florentine, the Roman, the Venetian, and, lastly, the Baroque school.

To the first belong the palaces of the Medici, the Pitti and the Strozzi at Florence, both having in them traces of Mediævalism and predominating strength. The house of the Florentine noble was literally his castle; the dark portal, and massive walls pierced with narrow openings, and the rugged rustication of the walls, all point to the troublous times in which these nobles lived.

The Roman style is less massive in treatment, and ornament is introduced less sparingly; a more refined taste was being developed, as evidenced in the works of Fontana, Sangallo, Bramante, and Michelangelo,—such as the Farnese Palace, the Palace of St. John Lateran, and the numerous villas with which the environs of Rome are studded. As to the churches of the Roman style, that of St. Peter's gives the key-note to all the others, and as almost all the first architects of the two centuries we are considering were engaged upon it, we may see in it the embodiment of this style.

The Venetian school is characterised by greater lightness and elegance, and includes among its ranks such men as San Michele, Palladio, and Sansovino; and the library of St. Mark at Venice, by the latter architect, forms a typical example of this school.

The Baroque style, introduced by Maderna, Borromini, and others, marked the decline of Renaissance art; its effects were, nevertheless, novel and striking, but were wanting in dignity and repose, and figures in impossible attitudes clinging for dear life to broken pediments marked the degenerate taste which prevailed.

First among the architects of this century, when the first faint glimmer of the dawn of the Renaissance was stealing over the land of Italy, stands the name of *Filipo Brunelleschi*, son of Lippo Lapi (born 1377, died 1444), who, though educated for far different pursuits, at an early age brought his powers of mind to bear, first on geometry, then on Dante and his writings, and eventually applied himself wholly to architecture, and, by earnestly studying the ancient masters in Rome and elsewhere, became imbued with the true spirit of the antique, and revived the ancient orders of the Doric, Ionic, and Corinthian. The two greatest works of this architect were the Pitti Palace at Florence, and the cupola over the cathedral, Santa Maria dei Fiori, in the same city. The Pitti Palace has a rugged simplicity, which makes this building astonish us, rather by its broad treatment of masses than by any delicacy or refinement of detail. The entire building is covered with rustic work, the blocks of stone in the lower story and in the wall of the terrace flanking the courtyard being of such an enormous size that they look like the work of giants. Some idea of the large proportions of this building may be obtained from the entrance-doorways, which measure about 28 ft. in height by 14 ft. in width. But Brunelleschi did not live to complete his work, and only carried the building as high as the second story, and later on Ammanati added mouldings and triangular pediments to the windows, to the detriment of the original design, which, as has been before stated, owed its beauty in a great measure to its simplicity of treatment.

When Brunelleschi's grand conception of raising a dome over the church of Santa Maria dei Fiori at Florence was first promulgated, his project was hailed with derision, and to prove that he was capable of performing what he undertook to do, he had recourse to the trick afterwards practised by Columbus. When the persons who had been clamouring to see his design were assembled, he produced an egg, and asked each one present to make it stand upright on the table. All tried, but failed, when Brunelleschi, striking off the end, accomplished the feat. "We can do that also," exclaimed those assembled. "So you will say when you have seen my design," replied the architect. The height of the cupola from the ground to the summit of the cross is 385 ft. It consists of an outer and inner shell connected together at intervals by walls, and it is octangular on plan. Other cupolas had been constructed previously to this, as at St. Sophia's, Constantinople, St. Mark's at Venice, and the Baptistery at Pisa; but this one outrivalled them all, both in size and ingenuity of construction. Brunelleschi was great not only in civil and ecclesiastical, but also in military architecture, for he designed the fortresses of Vico Pisano, the old and new citadel at Pisa, and he also built fortifications on the Ponte Amare. He died respected and beloved, and was buried under the shadow of his great dome at Florence; posterity has, moreover, awarded him the highest honours, for to him we owe the re-establishment of pure architecture and manly design.

Leon Battista Alberti (born 1398, died 1472) was a nobleman by birth, and son of Lorenzo and nephew of Cardinal Alberto of the Alberti, a Florentine family. Educated with the greatest care, and having a knowledge of mathematics, painting, and sculpture, and possessing a natural taste for the fine arts, he was not long in deciding on the profession which would be most suitable to a man of such varied acquirements. The church of San Francesco at Rimini bears witness to his powers of design, and is perhaps the most talented of all his works. The interior is still in the Gothic style, but the whole of the exterior was remodelled from his designs, and embellished with choice marbles. At Florence Alberti built the circular chapel of the Annunziata, which is wanting in many of the graces distinguishing his other works. The semicircular arches being circular on plan, have, as is usual in such cases, a distorted appearance, which mars the effect of the composition. The principal façade of Santa Maria Novella is attributed to Alberti; but Milizia, in his "Lives of Celebrated Architects," states that it was probably built by Giovanni Bellini. His life was passed as a true nobleman's should be, in liberality and courteousness to all, and he died at an advanced age in his native land.

During the early part of the fifteenth century, when the revived art was only feeling its way, and had not obtained that firm footing on the soil of Italy that the following century established, the names of great architects were few in number, and the two whose lives we have just considered,—namely, Brunelleschi and Alberti,—were the guiding stars of this epoch. Nevertheless, other architects flourished, some of whose works were of no mean merit, and amongst these were *Michellozzo Michlozzi*, a Florentine and a pupil of the sculptor Donatello. This architect succeeded in making a design for the palace of Cosmo de Medici, by which he secured the patronage of that influential man, and superseded Brunelleschi, who had previously made a design which was considered too sumptuous. Michelozzo built the famous library of the Benedictines at San Giorgio, Venice, to which city Cosmo had been banished in 1433, and whither his architect followed, with a devotion rarely witnessed in modern times. He made designs for and built the palace of Cafaggiulo, in Mugello, by order of the Duke Cosmo; also an ingenious villa at Fiesole, near Florence, on the side of a hill, with large cellars and stables under part; also the palace of the Tornabuoni, now belonging to the Marquis Corsi. Michelozzo died at the age of sixty-eight, and was interred at the church of St. Mark, at Florence.

Giuliano da Majano was also a Florentine, being the son of a stonecutter residing near Fiesole. Having studied architecture, he had the good fortune to be patronised by King Alphonso at Naples, where he built the great palace at Poggio, which is an exact square on plan, and is chiefly noted for the clever arrangement of its staircases.

About the middle of the fifteenth century flourished the celebrated architect *Bramantino*, whose field of operations was chiefly in Milan and the surrounding district. He erected the Church of St. Satiro in that city, which has been much praised, more, however, on account of the sumptuousness of its decoration than for its beauty of design; for the numerous arcaded corridors, and the many statues with which it is adorned detract from the main features of the design, and render them somewhat confused. Bramante, of whom we shall speak later on, is said to have benefited by studying his works, and we see tokens of this in many buildings erected by him.

Giovanni del Pozo and *Francesco di Giorgio*, of Siena, rank among the lesser lights of this epoch. The latter, however, erected some very creditable buildings, chief among which is the famous palace of the Duke Frederigo Feltre, at Urbino.

The sister arts of painting and sculpture were frequently combined in these times with the more practical art of building, and the appellation of "painter and architect" was as common then as "architect and surveyor" is in the present day. The artistic ideas of the nineteenth-century architects are often deadened by the worry of business; and this is greatly to be deplored, for the real artist should be free from the petty cares and anxieties which engross the bustling matter-of-fact people of the present day.

A liberal emolument will not evoke talent; nevertheless, architects, to do their work truly and thoroughly, require to have sufficient means to enable them to drive away anxious thoughts for the morrow, and the ancient architects were undoubtedly treated in a more liberal manner than those of to-day, or they could never have bestowed that painstaking care on their buildings which is so frequently exhibited, since their whole time and thoughts were often confined to one building, while the multifarious duties of the nineteenth-century architect disqualify him from taking that high position which was so acquired by the architects of Renaissance.

Having now briefly considered the architects of the fifteenth century, we pass on to those of the sixteenth century.

When on some bright summer's night we gaze upon the cloudless heavens, and see there some grand constellation which rivets our attention, and

* A paper by Mr. W. Hilton Nash, read before the members of the Architectural Association on the 3rd inst.

become for a time almost forgetful of the lesser luminaries, so it is when we pass in review the architects of the sixteenth century. Their names stand out so boldly among the lesser lights of art that we are for a time unaware of the existence of preceding or posterior artists, and we cannot help asking ourselves the cause of this great uprising and rebirth of intellect at a period when all true art seemed lost in a hopeless chaos. This great awakening to the study of the beautiful and the true, was mainly attributable to the cultivated tastes and judicious patronage of the leading families in Italy. They were the great motive-power which set the machinery of art in motion, and evoked the slumbering talents of men capable of greatness in every department of art,—in painting and sculpture, in poetry, music, and architecture. Well might Michelangelo and other contemporary architects have said of the Cosmos and Leos of the Medici family, as Horace said of Mæcenas, "O et præsidium et dulce decus meum," for had it not been for this opulent and cultivated family, many a talented artist who now illumes the page of history would have died "unwept, unhonoured, and unsung." Art patronage, however, is not the prerogative of the many, but rather the privilege of the few; and, like other good things, it must be judiciously administered, or its effects will be more baneful than productive of good; for far greater detriment is done to art by the ignorant patron, who enriches those who unjustly deserve it, than by the man who, though appreciating talent, fails to render it its due reward.

Bramante d'Urbino, though born at the end of the fifteenth century at Castel Durante, is generally classed among the architects of the sixteenth century. His talents were directed at an early age to painting, but he quitted it for the sister art of architecture, having studied and measured the principal ancient buildings at Rome, and the remains of the villa Adriana at Tivoli. His chief patrons were the Cardinal Caraffa, the Popes Alexander VI. and Julius III., and the Duchess Eleonora Gongaza, the latter of whom commissioned Bramante to build a palace for herself and her husband, the Duke d'Urbino. The greatest work of this architect was undoubtedly the re-building of the Church of St. Peter at Rome. In this design he equalled, if he did not surpass, the ancients, in the massiveness and unity of treatment which pervades the whole edifice. Strongly impressed with the grand proportions of the Pantheon at Rome, which, no doubt, he had studied in the days of his pupilage, he founded his design on this model and made his cupola of similar dimensions, adding the four arms of the Latin cross, forming, when completed, a building of unequalled vastness and grandeur.

Bramante could boast of having Raffaelle for a pupil and Michelangelo for a friend and adviser, and the great sculptor states his opinion that "Bramante is superior to all others since the time of the ancients."

Shall we praise or blame Bramante for the revival of the use of plastering and stucco ornament? There is much to be said in favour of the way in which he employed it, namely, on a wooden foundation; but unfortunately it latterly fell on evil times, its true place and use being forgotten, and the stucco, instead of assisting to decorate the buildings served only to overburden them with vulgar ornament. This is specially noticeable at Vicenza, where Palladio, not having had funds sufficient to erect his sumptuous designs in stone, has had recourse to plastered columns on a brick core, and the effect of time on these buildings has made them look pitiable in the extreme, and has given occasion to architects of the opposite school to decry all architecture of the Palladian school as a sham.

The most beautiful erection by this architect is the palace of the Cancelleria at Rome. The windows on the "primo piano," or first floor, have served as models for countless others, but none have surpassed the original. The façade is constructed of blocks of travertine from the Colosseum, which, during this century, served as a sort of quarry for numerous Roman palaces.

The beautiful dome of the Church of Santa Maria delle Grazie, at Milan, is certainly the most satisfactory of any of Bramante's works, and, as Fergusson says, in his History of Modern Architecture, "Had the architects of the succeeding age been only content to work with the moderate amount of classical feeling found in this building, we should have had no cause to regret the loss of the Gothic style; but the temptation to employ great pilasters and pillars, whose real recommendation was that they covered the greatest amount of space with the least amount of thought, was more than human nature could resist, on the part, at least, of men who were more artists and amateurs than architects."

The dome of Santa Maria is 65 ft. in diameter, and is consequently one of the largest constructed by Bramante, that at the church at Lodi being 50 ft., and the dome of the little church of San Pietro, in Montorio, at Rome, being only 15 ft. in diameter.

Bramante died in the year 1514, at the age of seventy, and was buried in great state in the church of St. Peter, the grand work of his lifetime, and which, had it been executed as orignally designed by him, would have been a church worthy of the golden age of Renaissance art.

The two brothers *Giuliano* and *Antonio di Sangallo* flourished about this time (1443-1517). They were sons of an architect, Giamberti, whose works have not been greatly praised, and, being educated as engravers, ultimately turned their attention to architecture. The principal works of Giuliano were the cupola of the church of the Madonna di Loretta, at Rome, built by order of Alexander VI., the fortifications of Ostia, the castle of Montefiascone, for the Duke of Valentino, and he latterly superintended the building of St. Peter's at Rome under Leo X. His disinterested motives, and his affection for his great patron Lorenzo de' Medici, are exemplified by the following story narrated by Milizia. After completing the fortifications of Ostia, he journeyed to Naples and presented a magnificent model to the king for some work at Castel Nuovo, which so pleased the monarch that he presented him with horses, clothes, and a silver cup containing one hundred ducats. Giuliano, however, refused to accept them, stating that he was still in the service of Lorenzo de' Medici, and the king, surprised at his noble independence, allowed him the choice of whatever pleased him, and he accordingly chose some fragments of antique sculpture, which he presented to his patron Lorenzo on his return to Florence. Antonio or Sangallo the younger has left many excellent works as evidence of his talent, and his designs for St. Peter's at Rome were replete with originality, and differed greatly from those of Bramante. The most ingenious work of this architect was the well at Orvietto, which is of great depth, and has two spiral staircases,—one inside the other,—descending to the well, so that one set of mules laden with waterskins might be descending while the other set were ascending. Sangallo began the Farnese Palace when Paul III. was cardinal, and when the building had reached the roof, the Pope, anxious to have a cornice which, in beauty and richness of design, should eclipse all former efforts, instituted a competition among all the able artists in Rome, but even the Pope's infallibility could not ensure a satisfactory termination to it, for the decision, as in nearly all modern competitions, was as absurd as it was unjust. Sangallo competed, but his design was set aside for one by Melighino, formerly the Pope's groom, and he was unable to restrain his righteous indignation at this unfairness, and explained to the Pope that this man was a mere mountebank of an architect. "We wish Melighino," said the Pope, "to be really an architect, and will therefore take care to provide for him." But the groom did not carry it out after all, and the execution of it was entrusted to Michelangelo.

Simone Pollaiuolo (born 1454, died 1509) was a Florentine by birth, but he visited Rome at an early age, and there acquired a strong passion for architecture. He superintended the erection of the Strozzi Palace at Florence, which was designed by Cronaca, and built the beautiful little church of San Francesco, on the hill of San Miniato at Florence, which has, however, been over-praised, on account of the notice taken of it by Michelangelo, who surnamed it "La Bella Villanella."

Sansovino (born 1460, died 1529) was the son of a peasant, and became famous in his early years for sculpture, but especially for the two tombs in the church of Santa Maria del Popolo at Rome, and afterwards became equally noted for his architectural works. He built the beautiful Capella del Sagremento at Florence, and as the adjoining the church of San Spirito, and as the compartments of the vaulting were not placed centrally over the piers, his clients found great fault with him, but he brought ancient examples to justify his design, and so silenced all criticism. The west façade of the Duomo at Florence was then, as at the present day, unfinished, and Sansovino placed against it a false façade of wood, of admirable design; but as the design was of the Classic type, with Corinthian pilasters, it is, perhaps, well for the harmony of the edifice that it was never executed. Sansovino made a design for a magnificent church at Rome, his drawings being preferred before those of Raffaelle, Sangallo, and Peruzzi, but the execution eventually devolved upon Sangallo, who was a better constructor than his contemporary. The library of St. Mark, at Venice, has, however, immortalised his name, and the building has a rich Doric order on the ground-floor, with a graceful Ionic above. Venice has, more than any other Italian town, been richly embellished by this architect. Having resided nine years in Portugal, at the invitation of Leo X. he returned to his native land, laden with rich gifts, and eventually built himself a villa near his birthplace, Monte Sansovino, where he spent the remainder of his life.

We have now to consider the character of a man who combined all that was manly and noble with a delicacy and refinement of thought which have seldom been surpassed. *Leonardo da Vinci*, the great painter, sculptor, architect, and anatomist, who was skilful in music and poetry, and added to a beautiful exterior the charm of graceful manners, was born in the Castel da Vinci at Florence. We are not acquainted with many of his architectural works; nevertheless, it is evident from his writings that he had studied the subject, and he was employed by Ludovico Sforza to conduct the waters of the Adda to Milan, and he made the canal of Montesano navigable for 200 miles. It was his habit to write on whatever he executed, but as all his writing, like Hebrew, is from right to left, it is not easily deciphered. His ingenuity was marvellous, and when the king of France, Louis XII., visited Milan, he fashioned the model of a lion, which, when the king was seated in the great hall of the palace, moved towards him by the aid of machinery, and on arriving at the throne it suddenly stopped, tore open its breast with its claws, and displayed on its heart the royal arms of France. Jealousy for his contemporary, Michelangelo, caused him to quit Italy, and at the invitation of Francis I. to visit France, but he was taken mortally ill at Fontainebleau, and the king immediately set out to see him. On the arrival of the monarch, Leonardo endeavoured to rise to pay him homage, but the exertion hastened his death, and he expired in the king's arms.

Raffaelle d'Urbino (born in 1483, died 1520) was the son of Giovanni Sanzio, a painter of some note, but whose name was eclipsed by that of his illustrious son. One of the first works of Raffaelle was the façade of San Lorenzo at Florence, for Leo X., and the palace of the Pandolfini. The stables of Agostino Chigi, in the Strada Longara, Rome, were designed by him; and here we see the coupled pilasters which were a constant feature in Raffaelle's designs; but this building is too much broken up to have a wholly satisfactory effect. He was one of the architects of St. Peter's, and in his design divided the Latin cross into nave and aisles, with recessed chapels in each bay. The arms of the cross were semicircular, and were ornamented with numerous columns and pilasters. The idea is said to have wanted grandeur, and, in fact, it required an almost superhuman genius to master all the difficulties which were connected with the construction of so vast a work. But although Raffaelle's architectural works were great, his powers of painting were far greater, and he was treated with every mark of reverence and respect, and after endeavouring to imitate Michelangelo in sculpture, in which, however, he failed, especially in the nude, he devoted his whole time to painting. He died at the early age of thirty-six, and was buried in great state at Rome, Cardinal Bembo writing his epitaph, which has been thus translated:—"To the memory of Raffaelle. Nature feared to be conquered by him while living, and to be annihilated at his death."

Let us now briefly consider the strange and varied life of *Baldassare Peruzzi* (born 1481, died 1536), who was the son of Antonio Peruzzi, a Florentine noble. The civil wars which were then raging in Italy caused his family to be left in great distress and poverty, and Peruzzi

accordingly journeyed to Rome, and devoted himself to painting and architecture. He, like his illustrious predecessors, was engaged in superintending the building of St. Peter's, and made some improvements on Bramante's original design. The peculiarity of this design was the semicircular termination to each arm of the cross, and the porches were also semicircular in plan, with three doorways in each, and the high altar was placed centrally. This arrangement has been much commended, and has been partly carried out, but the cupolas which covered the whole have not been executed. Peruzzi built, and afterwards decorated, the palace at Longara, now called the Farnesina, built originally for Agostino Chigi, and he has been especially praised for the ornamentation of the loggia, which is in such accurate perspective that Titian is said to have climbed up to ascertain whether the corbels were real or painted. At the sacking of Rome in 1527, when the Spanish soldiers were plundering the city, Peruzzi was seized, and, on account of his aristocratic person, was thought to be some Italian noble, but was freed on stating his profession,—not, however, before he had been barbarously treated by the soldiery, and he arrived eventually at Siena, naked and wounded, having been robbed of his clothes on the road. His stern refusal to enter the service of the Pope, who wished to employ him at the siege of Florence, shows that a spark of patriotism existed in him, and that the Papal rewards were incapable of corrupting him. Besides the Farnesina, already mentioned, Peruzzi built some other palaces in Rome, among which may be mentioned the Massimi palaces, and that which bears the name of the Ossoli family. It is stated that his extreme modesty prevented him from ever asking a reward for his labour, and he consequently died in poverty, his only support being his salary of 200 crowns as architect to St. Peter's. He lies buried in the Pantheon beside the illustrious Raffaelle, whose works he had studied, and in some instances surpassed.

The last three men whose lives we have been considering were almost as much painters as architects, and, in the case of Leonardo and Raffaelle more so, and it has been before remarked that this was not an uncommon occurrence in the fifteenth and sixteenth centuries. In the present day, however, we have no great artists who have attempted to combine the two. We frequently find an architect who devotes his leisure to painting, but where can we name a painter who has shown any aptitude for the nobler art of architecture, which not only requires an artist's eye to orginate the design, but a constructor's skill to carry that design into effect, and employ the materials most suitable in each particular case?

It would be well if the importance of architecture were more fully appreciated, for nothing shows the character, the wealth, or poverty of a nation, more clearly than the style of its architecture. "I cannot touch the lute," said Themistocles, "but I can make a small town a large city": and were the aristocracy of England and the wealthy merchants of London to take that pride in architecture which prevailed among the nobility of the Italian States, and the princely merchants of Florence, we might then find more earnest desire on the part of our architects to execute their work with that painstaking care and devotedness of which we see so many proofs in bygone times.

We are now in the full tide of the Renaissance, and all Italy has felt the influence of this stirring up into artistic life, which awoke the latent energies of the sixteenth-century artists. The bright and comely flower of Renaissance art has been nurtured and cultivated by rich and poor alike; warmed by the sun of genius, and gladdened by the freshening dews of intellectual effort, the tender stem has grown vigorous and healthful, and although not possessing the same energy as the hardier plant of Gothic art which preceded it, but partaking more of the character of a hot-house plant, it has, nevertheless, a charm and gracefulness of which antecedent artistic efforts were often sadly destitute.

Michele Sanmichele (born 1484, died 1559) was the great military architect of this age. He was taught the elements of architecture by his father Giovanni and his uncle Bartolomeo, who were both architects. He was sent by Clement VII, after having completed his studies, to visit and report upon the fortresses in the Ecclesiastical States; and having accomplished this, he started again to inspect the fortifications of Venice, for the purpose of improving his knowledge of these subjects. Verona, the birthplace of San Michele, has been embellished more than any other Italian town by the works of this artist, and the bastions which he built to fortify the town were on an entirely new principle, which has been adopted and improved upon by Vauban and others; but it was this architect who in reality invented the triangular or pentangular bastion with plain fosses and flanks, which doubled the support, and thus entirely superseded the ancient square and circular bastions. His fortifications at Venice were on an enormous scale, and those who were envious of his popularity suggested that the firing of the heavy artillery required for the defence would reduce his forts to ruins, and Sanmichele accordingly ordered the largest guns procurable to be brought and placed in the forts and all to be fired simultaneously. Many of the timid inhabitants fled when notice was given of his intention, and a terrific firing took place; but after it had ceased, not a crack or fissure was discovered in the fortress, and the fears of the multitude were converted into exuberant joy. He built the Porta Nuova, the Porta del Pallio, and the Porta San Zenone at Verona, and also the exquisite Pellegrini chapel, a work of small dimensions, but of the highest excellence. The stone of which it is built is found in the quarries of Verona, and is called "Bronzina," as when working it sounds metallic like bronze. He built five palaces at Verona, of which the Palazzo Pompei is the most harmonious in design, possessing a dignity of repose which is one of the essential elements of a Classic composition.

The universal genius of *Michelangelo* (born 1474, died 1564) cast such a refulgence over the tracts of Renaissance art, in painting, sculpture, and architecture, that all other artists seem lost for a time in the vigour and grandeur of the work of this great man. He did not devote himself vigorously to architecture till he was forty years of age, and his masters were his own talents, aided by his observations of ancient edifices. Two of his earliest works were the Medicean Library at Florence, and the second Sacristy at San Lorenzo, which is undoubtedly one of his finest designs. Michelangelo also made designs for several gates at Rome, but the only one which he erected was the Porta Numentana, or Porta Pia, as it was named, after Pope Pius IV., during whose pontificate it was built. He designed the Strozzi Chapel at Florence, and made many other designs for churches, few of which, however, have been preserved; and it was his constant habit to destroy any drawings which did not justly convey to paper the grand conceptions of his mind. His work at St. Peter's at Rome gives evidence of the sound knowledge of construction which he possessed, but his ornaments and mouldings are none of the purest, being frequently so whimsical as to border on ugliness; and he used sometimes to confess, perhaps only from modesty, however, that he knew nothing of architecture. It is well known that when pressed by Pope Paul III. to accept the office of architect to St. Peter's, he agreed to take it on condition that he received no salary, stating he did so "for the love of God."

Galeazzo Alessi (born 1500, died 1572), having studied mathematics, and shown an aptitude for mechanics when a youth, after perfecting himself in these subjects repaired to Rome, to be under the tuition of Michelangelo. His works in Genoa were very numerous, including the Palazzo Spinola, in the Strada Nuova; a handsome palace in the Porta Romana, for Signor Laoli; and the villas for Count Pallavacini, above Zerbius, and Signor Giustiniani, in Albaro. His church on the Carignano Hill, at Genoa, is sufficient in itself to make his name illustrious.

We now have to consider the lives of the two last great architects of the Renaissance, Vignola and Palladio. The former, whose real name was Giacomo Barozzi, was the son of Clementi Barozzi, a Milanese gentleman (born 1507, died 1573). He studied painting at Bologna, but eventually applied his mind to architecture, and produced a treatise in his later days, the outcome of his early studies in Rome, which has done more to perpetuate his name than all his works in stone and marble. He built many churches in Rome, and was employed by Pope Julius III. and the Cardinal Alessandro Farnese, who engaged him partly in the erection of the Farnese Palace. The celebrated Caprarola Palace, however, gained him the greatest encomiums, and eclipsed all his former efforts in ecclesiastical architecture. After the death of Michelangelo, Vignola was appointed architect of St. Peter's, and erected two cupolas on either side. His fertile invention often led him into extravagances, and induced him to depart from the correct forms and outlines of the ancients.

Palladio may be considered as the last great architect of the Renaissance. His finest ecclesiastical work is the church of the Redentore at Venice; but the work which has brought most renown to his name is the Basilica or Town-hall at Vicenza. In this city Palladio reigns supreme. Whichever way we turn we meet with his works, many of them finely conceived, but executed in plastered brick, so that their true grandeur cannot be justly estimated. The peculiarity of his style were lofty columns running through two stories, pedestals without panels or raised mouldings, simple architraves, doors, windows, and niches of simple design, and crowned with unbroken pediments. The *Quarterly Review* and many amateur critics have endeavoured to prove that Palladio's architecture was false in principle, since the internal arrangements did not always accord with the external effect; but we must remember that Renaissance architecture never aimed at this, external symmetry being its chief characteristic, while Gothic architecture had for its primary object the exposing of the bones and muscles of the structure to which it was applied. For the beauty of Palladio's architecture we must look to his façades, which are bold and imposing.

In the latter days of the Renaissance the art which had once adorned churches and palaces confined itself almost entirely to the interior decoration of the dwellings of the nobility, and the Baroque style succeeded the bright and cheerful efforts of the earlier designers. This universal decadence was the precursor of utter annihilation of all genuine æstheticism, and with the close of the sixteenth century the curtain fell on all true art.

I do not pretend in this short paper to have exhausted the subject with which I am dealing. There are many architects of this age whose works it has been impossible even to touch upon; my object has been rather to turn the current of our thoughts in the direction of pure Italian architecture, so that each one of us may for himself, if he so desire, enlarge the subject, and contemplate with fervid admiration, as I have done, the beauties of this noble style.

ST. LEONARD'S TOWER, WEST MALLING.

Sir,—To the short but valuable account of St. Leonard's Tower, West Malling, given by "G. T. C." in the *Builder*, November 27, I am desirous to add, with your permission, a few additional notes. That in architectural interest it comes up to, and quite deserves, every single word which Mr. J. H. Parker, C.B., has written regarding it, is most unquestionable; for few other specimens of this period probably throw more light on the state of building art, directly after the Conquest, than does it and the two other *early* works of Gundulph, in its near neighbourhood,—namely, "Gundulph's Tower" at Rochester Cathedral, and that portion of the wall of Rochester Castle, which is his work (that next the river); the whole three presenting curious variations of construction which induce me (though undoubtedly inclined to pay the very highest deference to the opinion of such a veteran and able authority as Mr. J. H. Parker) to believe the earliest in date of the three to be "Gundulph's Tower," *now* of the cathedral, but then merely built on the town wall, and originally intended as a protection to the members of his new monastic establishment, their valuables and documents, prior altogether to the reconstruction of his cathedral.

The quoins of the St. Leonard's Tower, supposed by "G. T. C." to be of some "local ragstone," are there (as in all his other works) of *tufa*. The bishop nowhere, I believe, uses any other material for dressings unless in the case of his monolithic columns, with their caps and bases, in the crypt of his cathedral (which material he seems to have brought from Northamptonshire by water). The singular plan of producing "weatherings" by simply setting back the courses, is another of his peculiarities here produced, as "G. T. C." states, by two recessions, but at "Gundulph's Tower" by merely one; as I take it, a further mark of its priority of date and rudeness of execution.

The further fashion of his work in rising

from the ground (or, at least, footings) without any plinth, takes place even in the remains of his cathedral, as does also the square order devoid of mouldings, save only a label,—a rule which, with him, seems invariable.

I am not altogether clear as to "G. T. C.'s" intention where, in describing the "abbey" church at Malling, he refers to its west end. No part of this is of Gundulph's date, though its transept is, and eastern parts were. The west end is later than the period of the bishop's death, and was itself, in its lower part, much tampered with at the end of the eighteenth century (see Hasted (?) or Thorpe). A careful study of the peculiarities of construction presented in the rubble walling of the two towers, that of St. Leonard's and the "Gundulph Tower" of the cathedral at Rochester, reveals variations in the herring-bone work used, and in the items of bonding, tending, equally with the simpler recessing of pilaster "weatherings," to prove that the last named is the earlier in date. On the whole, considering, indeed, that the bishop had a palace or residence in Rochester itself, it seems not unreasonable to believe that the new monastic establishment would take precedence over any of his country seats. In his work at Rochester Castle *wall* (the keep is none of his, of course, nor is there reason to believe he built there any, nor could be likely to desire such a next-door neighbour if it could possibly be avoided). He has introduced what is a most unusual method of construction. On the Cliff, buttresses, no doubt, would be of little use outside, and if placed inside, would be in the way. He has, therefore, introduced a sort of *better* rag ashlaring pillars, if it can be so called, formed at certain distances in the solid walling, *flush with its ordinary face*. Whether similar work exists outward I know not; but at that point of his wall next Rochester Bridge its destruction presents a section by which it is seen to present the square set-backs, which was his plan of producing "weatherings," as stated above.

In regard to the St. Leonard's Tower, while adding the conjecture that the top room may have been most likely the private chapel of Bishop Gundulph, and that I very much doubt if any other defences of the bishop's time on the spot were of more than wood only, I would join with your able correspondent, "G. T. C.," in urging the wish that that excellent society, the Kent Archæological, should at least give one *careful* illustration of the construction of, say, the north front. Or better, perhaps, for the benefit of mankind in general, that some one would carefully draw it, with parts of the rag ashlar, to a larger scale, and send it for publication in your valuable journal; for, in spite of the wide facilities for good and cheap illustration which now exist, one often sighs for the want of that wealth of illustration on such practical details for which the world had to thank the works which will hand down the name of Mr. J. H. Parker to all posterity, and are still the text-books to which we refer.

J. T. I.

MACHINERY AND APPLIANCES AT THE SMITHFIELD CLUB SHOW.

THERE is, as usual, a good display of agricultural machinery and implements, roots, and seeds, at the eighty-third annual Cattle Show of the Smithfield Club, in the Agricultural Hall and its adjuncts. The principal contributors of purely agricultural machinery are such well-known firms as Aveling & Porter, Rochester; Clayton & Shuttleworth, Lincoln; John Fowler & Co., Leeds; Richard Garrett & Sons, Leiston; Richard Hornsby & Sons, Grantham: J. & F. Howard, Bedford; Marshall, Sons, & Co., Gainsborough; Messrs. Ord & Maddison, of Darlington (who exhibit the "Koldmoos" weed-eradicator,—an ingenious machine); Ransomes, Sims, & Head, Ipswich; Robey & Co., Lincoln; and Ruston, Proctor, & Co, Lincoln. Most of these exhibitors, and many others, show a large variety of portable and other engines available for purposes other than agricultural, but none of them calling for any special notice. The heavier exhibits are as usual arranged under the galleries, and among them we need only mention Messrs. Aveling & Porter's well-known traction engines (Stand 15), Messrs. Clayton & Shuttleworth's 10-h.p. fixed engine (Stand 8), very well finished, and simple in action; Messrs. John Fowler & Co.'s (Stand 7) single-tipping wagon, suitable for contractors' use, and their 10-h.p. patent compound "Yorkshire" engine. Messrs. Barrows & Stewart, of Banbury (Stand 5), show some good portable engines. The Bristol Wagon Works Company (Stand 19) have a goodly show of carts and wagons for agricultural purposes; and Messrs. Hayes & Son, of Stamford and Peterborough, exhibit their "Royal Society" tip-wagon, which would appear to be as well suited for scavenging as for agricultural purposes. Messrs. Croskill & Sons, of Beverley, also make a good display of excellently-built carts and wagons. The great bulk of the exhibits is contained in the spacious galleries, but out of the mass we can only mention those which come within or are closely connected with our own special province. Messrs. Bayliss, Jones, & Bayliss, of Wolverhampton (Stand 123), exhibit a variety of iron hurdles and fencing, including the "Victoria" rivetless hurdle, in which the ends of the horizontal bars are turned down and brought back again through the uprights, and then clenched. Mr. John Bellamy, of Millwall (Stand 84), exhibits wrought-iron water-tanks, corn-bins, troughs, &c.; and Messrs. Burney & Co., of Millwall Docks (Stand 72), have a display of similar goods, wrought and galvanised. Messrs. Croggon & Co., of Upper Thames-street (Stand 86), are exhibitors of galvanised iron tanks, corn-bins, wire netting, &c. Messrs. Hill & Smith, of Brierley Hill (Stand 158), exhibit iron fencing, including Gillett's patent rivetless hurdle, the horizontal bars being secured in the uprights or standards by hydraulic compression whilst the iron is cold. Mr. J. C. Humphreys, of Knightsbridge (Stand 97), exhibits models of galvanised iron buildings for agricultural purposes. Messrs. F. Morton & Co., of Liverpool, have a good display of galvanised corrugated iron roofing and wire fencing, the former shown in its application as a covering for ricks, &c. Messrs. Penney & Co., of Lincoln (Stand 32), exhibit flat and rotary screens for gravel, lime, &c. The St. Pancras Iron Works Company (Stand 100) have a good display of iron cow-stall fittings, piggeries, &c. Messrs. J. & B. Sainty, of Wisbech (Stand 126), exhibit their new patent "Universal" fencing, which possesses several good points. The wrought-iron standards are very light, yet require no fixing in the ground, standing as they do on a broad base. The horizontal bars, of wood, can be quickly inserted or removed, so that the fence is easily portable. Messrs. R. Waygood & Co., of Falmouth-road, Great Dover-street (Stand 194), exhibit some good horizontal steam-engines, and a new gas-engine (Robson's patent) manufactured by them.

Not included in the official catalogue of the Smithfield Club Show are a large number of exhibits, most of which do not come within the purview of agriculture, and these are arranged in the arcade by which the show is entered from Islington-green, and in St. Mary's Hall. In the arcade entrance, Messrs. F. W. Reynolds & Co., of Acorn Works, Blackfriars-road, exhibit a small but representative collection of their many well-known wood-working machines, including the "Eclipse" mortiser. Messrs. F. Rosher & Co., of Upper Ground-street, exhibit stable bricks, terra-cotta and stoneware garden edging, &c. Messrs. Tracey & Sons, of Ilford, show their system of glazing without putty, and their metallic tubular sash-bar. Messrs. Wurr & Lewis, of Laurence Pountney-lane, are exhibitors of band-sawing and other wood-working machines.

In St. Mary's Hall there is a heterogeneous collection of articles, including perfumery, marking-ink, and stencil-plates, the thousand-and-one "notions" (American and English) in regard to domestic appliances, and such other things as those with the mention of which we conclude this notice. Messrs. Robert Boyle & Sons, of Holborn-viaduct, exhibit their air-pump ventilators and a new chimney-cowl for preventing smoky chimneys. Messrs. Ewart & Son, of Euston-road, exhibit their "Empress" ventilators and "smoke-cures," together with bath-heating apparatus and a large zinc dormer. Messrs. Jones & Willis, of Euston-road, show their "Hesperus" lamps. Messrs. Charles Powis & Co., of Gracechurch-street, are exhibitors of sawing-machinery, and Messrs. Pfeil & Co., of St. John-street-road, and Messrs. Selig, Sonnenthal, & Co., of Queen Victoria-street, show engineers' tools and specimens of iron of different brands. Messrs. Hamilton & Co., of Leadenhall House, exhibit their pavement-lights. Messrs. S. & E. Ransome & Co., of Essex-street, Strand, show a variety of small domestic appliances. The Sun Auto-Pneumatic Lighting and Heating Company exhibit their portable gas apparatus. Messrs. John Tomlin & Co., of Capland-street, Lisson-grove, exhibit a new mode of shoeing horses with a view to "roughing" in frosty weather. It should be added that the whole of the piggeries and other parts of the Show are disinfected, apparently with perfect success, by the Sanitas Company's products.

IN THE ENGLISH SECTION OF THE MELBOURNE EXHIBITION.

Mr. George Jennings.—An especially fine and exceedingly large display of baths, lavatories, and general sanitary appliances is sent by Mr. G. Jennings, Lambeth, London, for whom Messrs. Alston & Brown, Melbourne, are agents. There is shown a beautifully fitted-up lavatory, for gentlemen's residences, first-class hotels, &c. It combines all the essentials of compactness, with elegance and convenience. In addition there are less expensive appliances of a similar character, and every household convenience which can be mentioned. The local papers say, "We can quite believe the statement of the official catalogue, that Mr. Jennings's display has taken the highest award at every exhibition."

Messrs. George Wright & Co.—The above well-known stove-grate makers, of Burton Weir Works, Rotherham, and Queen Victoria-street, London, exhibit a few specimens of their manufactures in the shape of open fire-grates, fenders, fire-iron rests, &c. This firm earned its reputation as inventors and sole manufacturers of the English stove, the "Bivalve," which is an improvement on the Stevens principle. Of this class is their drawing-room stove (No. 555), which is a good illustration of artistic grace, while showing the rich effect that may be arrived at by combining in proper proportions ormolu and bright steel. No. 500 is also a drawing-room stove, and was, we understand, specially designed to exhibit the most beautiful of hand-painted panel tiles. Between the above stoves stands a massive dog-grate in the style of the Renaissance. The tile and slow-combustion grates, &c., suitable for general use, are, like all the work of this firm, simple in design and extremely neat in appearance.

Messrs. Arrowsmith & Co.—Interior decoration as an art has now reached great perfection among us. The firm of Messrs. A. J. Arrowsmith & Co., decorators and upholsterers, of 80, New Bond Street, London, has long been very favourably known in connexion with this subject. Especially have they become famous for the beauty and durability of their excellent patent solid parquet flooring, and their exhibits at Melbourne cannot fail to greatly conduce to their renown in the colonies. Their exhibit consists of the following objects:—Various specimens of solid paraquet flooring, showing portions of floors laid for the Queen at Windsor Castle, and numerous public buildings and mansions; a very elaborate hand-carved staircase balustrade, in oak, polished; a very handsome bedroom suite in walnut and olive wood, inlaid brass finishings, &c.; a beautiful drawing-room cabinet in satin-wood, with hand-painted panels picked out in gold, in French style of Louis XVI.; dining-room suite,—light oak sideboard, bevel mirrors, carved panels, brass finishings; light oak chimney-piece, designed to harmonise, hand-painted tiles at the sides, marble linings, fender, dog-stove, &c., complete; light oak dinner-wagon table, side tables, chairs stuffed morocco. There are also several specimens of inlaid, carved, and parquet dados and wood panelling, and finally, there is a good selection of decorative drawings. The specialty of Messrs. Arrowsmith & Co.'s solid parquet flooring (patented) consists of being 1 in. thick, grooved and tongued together with marine glue, keyed at back, and traversed to a uniform thickness. For this ten prize medals have been awarded at the various exhibitions. We recommend colonists in London to pay a visit of inspection to the showrooms in New Bond-street.

The Worcester Royal Porcelain Company (Limited).—This old-established company have made a fine display of their productions, not specially got up for the Exhibition, but consisting for the most part of "every-day articles, neither expensive nor elaborate, but likely to be serviceable to the Australian colonist." The Royal Porcelain Works at Worcester were originally established in 1751 for the manu-

facture of fine porcelain, and in 1789 they received the first Royal patent. Since then, in consequence of the great increase in business, the manufactory has been much extended, and the variety of its productions greatly increased, and in every respect it now stands second to none.

THE SEWERAGE WORKS FOR PETERBOROUGH.

The sewerage works now completed for the corporation of the city and borough of Peterborough involved the construction of thirteen miles of brick and pipe sewers, with the necessary manholes, ventilators, flushing arrangements, and penstocks; the construction of duplicate tanks for the straining of the sewage at the outfall, and two miles of concrete carriers; the preparation of 96 acres of land out of a farm of 300 acres purchased by the corporation for the utilisation of the sewage by irrigation; the erection of two pumping-stations, with the necessary machinery, and the erection of two cottages.

The sewage from all parts of the borough is brought together and discharged at one outfall. It is conveyed by the water-carriage method on the separate system. As about seven-eighths of the entire population of the borough dwell on the north side of the river Nene, it is consequently in this portion that the largest and most costly sewers are constructed; but the peculiar situation of the southern district renders the conveyance of the sewage to a suitable outfall a matter of considerable difficulty.

The borough on the south side of the river is drained by 3¼ miles of stoneware-pipe sewers, and the sewage brought to the river side, whence it is carried in an iron-pipe sewer under the river and across the wash-lands. After passing under the protecting bank of the north level, it is emptied into a tank sewer, devised for the reception of the sewage during the time the pumping engines are at rest. It then flows into the wells of the southern outfall pumping-station, and is put into the gravitation main close to the outfall.

The borough on the north side of the river is drained by nine miles and three-quarters of brick and pipe sewers. The northern arterial main is a brick sewer, egg-shaped in section, of 3 ft. by 2 ft. internal diameter, and 3,670 yards long. The main intercepting brick sewer is 1,235 yards long, and comprises 149 yards of 3 ft. by 2 ft. egg-shaped; 612 yards of 2 ft. 9 in. by 1 ft. 10 in., egg-shaped; and 474 yards of 2 ft. barrel sewers.

These sewers discharge into a barrel culvert, 3 ft. 4 in. in diameter, and 508 yards long, which empties into a penstock chamber, whence the sewage is taken by two 24-in. iron pipes, laid side by side, and for the most part in embankment to the straining-tanks at the outfall. The sewage from the districts north of the river flows directly on to the irrigation area by gravitation.

The geological formation through which the trenches were excavated includes principally members of the oolitic group, but in the south ward gravels of the post-tertiary period overlay the jurassic rocks. The thick beds of hard stone met with in nearly all parts of the north and east wards have caused the excavations to be difficult and costly; but the stone was utilised in the construction of the roads and the concrete carriers on the sewage farm.

The pumps by which the sewage at the southern outfall is lifted into the gravitation main are two duplicate three-throw lift-pumps, driven by two high-pressure non-condensing horizontal engines of six-horse power. The normal speed of the engines when working with a boiler pressure of 45 lb. is 100 revolutions a minute; and each pump working at twenty double strokes a minute will lift 400,000 gallons in twelve hours.

The sewage on arriving at the outfall is discharged into settling-tanks, built in duplicate, and provided with wrought-iron strainers. Passing thence, the liquid sewage is conveyed in a concrete carrier to the land prepared for irrigation. On arriving there the carrier divides into two smaller ones, from which the sewage is distributed over the irrigation area by land-carriers. The larger concrete carrier is 1,098 yards in length, and has a water-way of 6·5 superficial feet. The two smaller carriers are 2,159 yards long, and have a sectional area of 4·8 superficial feet. The irrigation-channels are 1 ft. wide at the top, 6 in. at the bottom, and 6 in. deep. All the carriers are laid in horizontal lengths, with sluices and drops at every change of level. The soil on the irrigation area is of a light alluvial character overlying silt, and has a natural filtration and drainage of 4 ft.

As the farm is situated near the Bedford Level, and within the protection bank of the North Level Commissioners, the effluent water is not allowed to be carried off by their drains, except in dry seasons, and must consequently be lifted over the north bank into the New Cut of the river Nene. This is effected by two 12 in. centrifugal pumps, driven by two 25-horse power high-pressure condensing engines. The normal speed of the engines is sixty revolutions per minute, with a boiler-pressure of 60 lb. The cylinders are 1 ft. 4 in. diameter, and the stroke 2 ft. The fly-wheels are 10 ft. in diameter, and weigh 2 tons. Each pump, when making 400 revolutions per minute, will deliver over the bank 1,600,000 gallons in six hours. The boilers are Galloway's patent, with shells 18 ft. long by 6 ft. diameter.

The works were designed and carried out by Mr. John Addy, C.E., of Peterborough, with Mr. John C. Gill, C.E., as resident engineer. The contractors for the buildings were Messrs. S. & W. Pattinson, of Ruskington, near Sleaford; and for the engines, pumps, boilers, and machinery, Messrs. Seekings & Ellery, of Gloucester. The works on the main drainage and irrigation farm were partly executed by Messrs. J. S. Cooke & Co., and partly by the Corporation.

LIVERPOOL ARCHITECTURAL SOCIETY.

The third meeting of this Society was held at the Royal Institution, Colquitt-street, on the 1st inst., the President (Mr. C. Aldridge, F.R.I.B.A.) in the chair, when a discussion took place with reference to "Some City Improvements."

Mr. Wm. Parslow, in opening the discussion, explained that the subject would probably induce the belief that it was his intention to propose some grand general scheme for street improvements, but such was not the case: his thoughts were of much smaller matters. He had seen and heard of so many accidents arising from carelessness in hoisting goods into warehouses in crowded business thoroughfares, such as North John-street, that he thought the corporation should take some decided step towards insisting upon proper protection being afforded the public. The next evil that suggested itself to him as requiring consideration was the danger to which wayfarers were subjected owing to there being no by-law compelling plumbers and slaters to provide against broken slates and other material falling from roofs under repair, and undoubtedly provision was necessary on all houses to prevent loose slates falling into the streets. There had been serious accidents recently from this cause, one ending fatally. There was great want of protection to life and property at the foot of Leece-street also, where there were accidents almost weekly from runaway horses; and last, but not least, there was no waiting-room and convenience accommodation for women in any part of the city; men had been fairly well cared for in this respect, but women had been entirely neglected. He thought that this subject should be taken up by the Corporation, and proper accommodation provided at different points; and if each were partly free, and a small charge made for the use of the remainder, the income would cover the cost of the whole.

In the course of the general discussion that followed, it was stated that a new Building Act was being compiled by the Corporation authorities, and the hope was expressed that the society and the Master Builders' Association would be invited to send representatives to act on the committee in whose hands the drafting of the Act lay, in order that the best information on all points might be obtained.

It was suggested that the question of warehouse-hoists, and protection to the eaves of roofs, might very well be dealt with in the new Act, together with the foundations of new buildings, with regard to which great laxity appeared to prevail with the authorities, instances being brought forward of large ponds in the outskirts of the city being entirely filled with refuse of the worst description, and houses being planted upon them directly the operation was completed.

The President explained that, in London, front walls were carried above the eaves to form parapets, which effectually prevented the fall of slates, &c., into the streets, and, at the same time, the gutters behind the same formed a safe means of escape from house to house, in case of fire.

Previously to the holding of the ordinary meeting there was a meeting of the class of design and construction in the small library, presided over by Mr. Aldridge, when thirteen designs for a "cemetery chapel" were handed in by students, several exhibiting considerable merit.

SOCIETY OF ENGINEERS.

At a meeting of the Society of Engineers, held December 6th, 1880, in the Society's Hall, Victoria-street, Westminster, — Mr. Joseph Bernays, president, in the chair,—a paper was read by Mr. Frank W. Grierson, member of the Physical Society, London, &c., "On the National Value of Cheap Patents," in which he showed that the stamp duties on a patent in this country lasting over fourteen years, are 175*l.*, while those on an American patent, lasting seventeen years, are only 7*l.* A table was given of the applications and grants of the British and American patent offices during the last ten years, from which it could be seen that our 50*l.* stamp duty at the third year kills 70 per cent. of the patents granted; and that our 100*l.* duty, at the seventh year, kills 20 per cent. more, leaving only 10 or 11 per cent. to complete the full term.

From a comparative table of average results for the last ten years it was seen that the applications for patents in the United States and Great Britain respectively are 19,770 and 4,496; and the grants are 13,355 and 2,980. The average cost to the inventor for one patent, including patent agent's charges, are there only 19*l.*, but here 190*l.* Only one patent is granted in this country to three that are granted in the States, after allowing for the difference in population; and the duties on one patent here would pay those on twenty-five there. We may, therefore, say fairly that the British inventor is handicapped at twenty-five to one in favour of the American; and it is to be remembered that in handicapping the inventor we handicap the nation.

LIABILITY OF BUILDING-OWNERS.—THE HAYMARKET ACCIDENT.

PERCIVAL *v.* HUGHES.

This was an action brought to recover damages for injuries alleged by plaintiff to have been caused to premises belonging to him through the defendant's negligence in re-building the adjoining house. It was tried at Westminster last week, in the Queen's Bench Division, before Mr. Justice Manisty and a special jury.

Mr. W. G. Harrison, Q.C., and Mr. M'Call, appeared for the plaintiff, and Mr. Philbrick, Q.C., and Mr. Kingsford for the defendant.

Mr. Harrison, in opening the case for the plaintiff, stated that his client was the owner of a house in Panton-street, Haymarket, adjoining the new building belonging to the defendant at the corner of the street, which, when roofed in and far advanced towards completion, fell with a crash in January, 1878, dragging down with it a house adjoining it (on the Haymarket side) and killing the occupier of that house,—Mr. Baron. In falling, the new building partially pulled over the party-wall dividing it from plaintiff's house, and the latter sustained certain damage to its structure and internal decorations. The learned counsel proceeded to explain, by means of photographs and plans, the appearances presented by the ruins after the accident, and after citing many of the statements made at the inquest * on the body of Mr. Baron, argued that the fall of the building was due to negligence on the part of the owner or his agents.

After considerable arguments between the counsel, his lordship expressed the opinion that it was unnecessary to go further into the case, and, in deference to this opinion, no witnesses were called on either side, although

Mr. Philbrick addressed the jury for the defendant, pointing out that he had employed an architect of considerable experience, Mr. W. Wimble, to prepare plans and specification, and

* Reported in *Builder* for 1878, pp. 227, 249—251 274—276.

to superintend the erection of the new building, and had employed a respectable and reputable firm of builders (Messrs. Newman & Mann) to carry out the work. He contended that every and all the usual means had been taken calculated to ensure the safety of the adjoining properties, and that the accident was due, as stated by witnesses at the inquest, to the cutting away of the lower part of Mr. Baron's party-wall, for the purpose of fitting a new staircase,—an act unauthorised by the defendant or his architect, or by the clerk of works representing the architect, and one for which the builders alone were responsible.

Mr. Justice Manisty said he was of opinion that there was no question in the case for the jury. He did not think the present case could be distinguished from that of Bower *v.* Peate (1 Q. B. Division, p. 321). There it was held "that a man who orders a work to be executed on his own premises,—lawful in itself, but from which, in the natural course of things, injurious consequences to his neighbour must be expected to arise, unless means are adopted by which they may be prevented, is bound to see to the doing of that which is necessary to prevent the mischief, and cannot relieve himself of his responsibility by employing some one else to do what is necessary to prevent the act he had ordered to be done from becoming wrongful." He had no reason to suppose the decision in the case was likely not to be upheld, and therefore, taking the facts relied on by the defendant to be as stated, he should direct the jury to return a verdict for the plaintiff.

This having been done,

His Lordship gave judgment for the plaintiff for such amount as might be agreed upon or ascertained to represent the damage he had sustained by the falling of the defendant's house.

ROMAN WORK IN ENGLAND.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE second meeting of the session was held on Wednesday last. Mr. Thos. Morgan, F.S.A., in the chair. Mr. Gordon M. Hills exhibited a large collection of Romano-British fragments of pottery found at Manor Farm, Wanborough Plain, Wilts, where foundations of buildings have been met with, and others are believed to exist. Mr. Hills described the position on the line of the thirteenth Iter of Antoninus, and suggested that it was the site of a lost Roman station, being where one may reasonably be supposed to exist in relation to the next one on the line of road. Mr. Way exhibited some Roman coins recently found at Exeter; and the Rev. Mr. Maude a large series of foreign silver coins. Mr. Butcher produced a fragment of Roman Samian ware from the wall of London now opened at the back of America-square; and the chairman a perfect tile from the same place. It measures 17½ in. by 12¾ in., and is 2 in. thick. Mr. Loftus Brock exhibited a drawing of the wall, and, after a description of the discovery, pointed out its resemblance to the wall in the Tower of London, which was then described in a short paper. A vote of thanks was proposed and carred unanimously to Major-General Milman, C.B., Major of the Tower, her Majesty's Office of Works, and to Mr. J. Taylor, for their united efforts in having the fragment cleared for inspection in response to the wishes of the Association. The Rev. Dr. Hooppell then described at length the very remarkable discoveries that have rewarded the exploration of the Roman station of Vinovium, the modern Binchester. This costly work has been undertaken by Mr. J. Proud, of Bishop's Auckland, under Dr. Hooppell's directions. The external walls have been traced and found to be built on an earlier British wall. The plinth is chamfered similar to the wall in America-square. A paved road, 30 ft. wide, extends through the station, and the walls of many private dwellings still remain, many of the doorways having bases of pillars in position. A large circular building was cleared out, and here and elsewhere the walls were found to be lined with hot-air flues of terra-cotta kept in position by T-irons. Traces of reconstruction were found in every direction, and a mutilated statue of Flora was found serving as a support to some paving. The lecture was illustrated by a series of large coloured drawings, which gave a clear idea of these important and extensive discoveries. A large portion of the station remains to be opened out, although so much has been done.

HOUSE-BUILDING AT LEWISHAM.

AT the last meeting of the Lewisham District Board of Works, attention was drawn by one of the members to buildings going on in the neighbourhood. He stated that something like five-sixths of the more modern houses in the district were built on grass, and in many instances on absolute mud. Several other members of the Board also complained of the growing evil, various houses being named. After some discussion on the matter, letters were ordered to be written to the various district surveyors, calling their attention to these infringements of the Metropolitan Board's bye-laws, which order the foundations to be built on concrete. These directions of the Lewisham Board to the surveyors do not, however, appear to satisfy some of the residents, who wish more peremptory action to be taken against the offending builders. In a communication to the authorities, one of them states that he can vouch for the truth of the complaints which had been made to the Board, having seen many of the houses in question.

FROM SAVOY-STREET TO THE THAMES EMBANKMENT.

To the different streets leading from the Strand which have in succession been opened out for carriage-traffic on to the Thames Embankment, Savoy-street may now be added. Hitherto communication with the Strand from the bottom of Savoy-street, abutting on the Embankment, has been confined to a footpath, but the enclosed space at the lower end of Savoy-street, immediately under the buildings in Lancaster-place, has been thrown into the carriage-way, and is now being curbed, paved, and otherwise laid out for vehicular traffic, by the Metropolitan Board of Works, with a spacious curbed footpath in the direction of Waterloo Bridge, forming a junction with that on the Embankment. The works are expected to be completed in a few days.

"SANITARY SCIENCE IN ITS RELATION TO CIVIL ARCHITECTURE."

SIR,—Out of the many similar difficulties with which architects have to deal, let me call attention to two little ones, both mentioned in Mr. E. C. Robins's interesting paper at the Royal Institute of British Architects on the 29th ult.

1. Is it quite settled that soil-pipes must never be put inside buildings? Again and again this is repeated till it seems almost criminal to listen to doubts about it. Yet I am assured that not unfrequently, in exposed situations,—after a severe winter has been doing its worst,—soil-pipes have been taken indoors and kept there. In bitter cold a thin film of ice had formed itself on the inside of the pipe; no sun or warm wind came to thaw it; it was added to from time to time until nothing could pass through the pipe. Some of the best foremen urge this sort of argument with great force. Which is the worst?—to expect to find that such a pipe placed inside the building will some day be out of order, and will need repair, or to put it up and take it down at least once in every winter in the midst of intense frost? Every soil-pipe may very well be carried up, full size, above the roof, and fresh air be passed through it; but must an architect rush thus from one sort of peril into another? Does "should be" in Mr. Robins's,—"(3) The soil-pipe *should* be fixed outside the house," mean "must be"?—unless even mild persons are to talk of "gross ignorance and culpable carelessness,"—and return verdicts of manslaughter as matters of course?

2. I should like to ask for the results of experience in the use of a soil-pipe with open ends,—as applied by Mr. Norman Shaw. Are there any instances of such pipes being in use for a good length of time without stoppage?—without the pipes becoming foul, and needing to be renewed?—without the grating at the ground level giving off very offensive smells? No true test of such a system has been made at the end of a couple of years. Many people hesitate still to think of using the system, believing that a complete renewal of the pipes must be inevitable after they have been in use a very few years; but even these careful persons look with interest for information, and, indeed, seem to hope that their doubts may be gradually dissolved.

3. Has the last word been said about trapping sink wastes? Professor Corfield and Captain Galton, in the discussion at the Royal Institute of British Architects, went a certain length,—pointing out that mischief may come through waste-pipes which are not trapped at the top, even though the pipes convey nothing more suspicious than the water of London water companies. But, can the traps themselves be trusted? I do not simply mean that the water in the traps will be tainted by air in the foul pipes below them, but that the interiors of the traps will not escape from the influences which corrupt the pipes. An instance may be given from my own observation. A small lead-lined sink is placed in the corner of a cupboard in a room. A fixed brass grating in the bottom of the sink has below it 4½ in. of lead pipe,—that is, a dip-pipe entering a lead ⊃-trap,—dipping about 1½ in. below the water-line of the trap. The trap is a well-made (6 in. total depth) trap, with a brass screw-cap on the face of it. The 1-in. lead waste-pipe is carried about 10 ft. vertically, and discharges on another lead sink, on the story below. Here are no connexions with drains; nothing but water practically pure (no slops, &c.) is put down the sink; the inside of the trap is kept thoroughly clean,—yet a very strong smell has, I am told, at intervals made the room noisome. The short pipe from the sink to the trap seems to be the offending part. If there were a syphon-trap below the grating there would be a similar bit of pipe above the water-line. The substitution of a tight-fitting plug for the open grating may be a radical cure in this instance; but is there no detergent which would take all the evil out of the pipes, and leave all sweet, if applied say once a month? Most people treat lightly other people's experience; but are we to believe that butlers and servants generally are not so wrong after all in their belief, that very perfect sinks *will* smell at times, when they have been used for a while? Will somebody put the finishing-touch to the teaching about sink-pipes, which has afforded scope for a good deal of patient perseverance already? Till that is done, it is to be feared that good sanitation will still be sniffed at.

A.R.I.B.A.

MR. SAGE'S WORKMEN'S CLUB.

ON Friday evening, the 3rd inst., a Workmen's Club and Institute was very successfully inaugurated in connexion with Mr. F. Sage's shop-fitting establishment, at 80-84, Gray's-inn-road.

Impressed by the great inconvenience suffered by his *employés* in obtaining their meals at the very indifferent cook-shops, public-houses, &c., in the neighbourhood of his factory, Mr. Sage has placed a large room at their disposal, rent free, and also the materials for the fittings, such as tables, forms, shelving, &c., which have been manufactured by the members of the club in their spare time, and the result is a really comfortable apartment, capable of accommodating a very large company seated.

Four daily and two weekly papers are at present taken in. Additional literature will soon be provided, and a library is in course of formation.

The club is entirely self-supporting, by means of an entrance-fee and small weekly subscription, and the members are amply repaid for these small disbursements by the daily saving in the cost of meals, the conspicuous cleanliness, and the quality of everything supplied, all stores being bought and examined by the committee of management.

The meeting on Friday was the occasion of a supper, at which Mr. Sage and some friends were entertained, to commemorate the opening of the club.

The stewards of Mr. Sage's club express themselves willing to render any assistance in their power to others who may wish to form similar institutions.

COMPETITIONS.

Tipton Gas Works.—The Tipton Local Board have awarded the first premium of 100*l.* to Mr. Proud, of Birmingham; and the second of 50*l.* to Messrs. Bromilow & Cheers, of London and Liverpool. Provision had to be made for an annual consumption of 60,000,000 cubic feet.

Wesleyan Middle School, Truro.—The directors of the Wesleyan Middle School, Truro, decided some time ago to erect new schools and master's house, providing for 100 boarders. In an open competition, Mr. Etwell, of Birmingham, obtained the first place. The designs submitted by Messrs. Bromilow & Cheers, of Liverpool and London, gained the second premium.

Board Schools, Isle of Man.—The design under the motto of "Simplex," for the Douglas (Isle of Man) Board Schools, submitted by

Messrs. Bromilow & Cheers, of Liverpool and London, has been awarded the first place, and those gentlemen have been appointed architects to the committee. Fifty architects entered the competition.

Burton-on-Trent Market.—Competitors are inquiring for the result of this competition, designs having been sent in some five months ago!

COMPENSATION CASES.

THE WIDENING OF LUDGATE-HILL.

The case of Smith *v.* The Corporation of the City of London was tried in the City Court of Sessions, before the Recorder (Sir Thomas Chambers, Q.C.) and a special jury.

The plaintiff was the owner of 33 and 35, Ludgate-hill, and in March last, having made preparations for the pulling down the old premises and erecting more commodious ones, he was served with an order by the Commissioners of City Sewers to put them back a considerable distance, under the powers of the Act of Parliament for the widening and improvement of the hill. The claim, which was for 16,007*l.*, was made up of various charges for loss of extent of premises, and the decreased rental consequent upon it. There were other claims for loss of profit on stock purchased in anticipation of the proposed enlarged premises, and for extra expense in building, the present smaller premises requiring a stronger wall to carry the weight of the rooms over them.

On the part of the Corporation it was contended that the claim was an excessive one, and should have been nearer 4,400*l.* than 16,007*l.*

The jury found for the claimant—damages, 9,691*l.*

In the case of Glover *v.* The Corporation of the City of London, which was also heard in the same Court, the plaintiff was the lessee of 15 and 17, Ludgate-hill, where he carried on the business of a ladies' and juvenile warehouse. He claimed 11,500*l.* in respect of having received similar notice to put back his premises, by reason of which he lost space, and the value of his leases was reduced.

The jury found for the claimant—damages, 6,340*l.*

CHARGE OF DEFRAUDING BUILDERS.

At the Guildhall Police Court, on the 7th, George Charles Adolphus Smith, of 114, Fenchurch-street, and 3, Downs-road, Clapton, colonial merchant, was summoned before Sir Thomas White for obtaining goods under false pretences. Mr. Besley prosecuted; Mr. Mead appeared for the defendant.

The case was only partially gone into, and as far as the evidence went it showed *primâ facie* that the defendant purchased some freehold land from the London Financial Association (Limited) in November, 1879. He afterwards entered into a contract with Messrs. Perry & Barlett, builders, of Stratford, to build a house for him. They went on with the building, and after they had put about 2,300*l.* worth of material and labour on the ground and received 500*l.* on account, the defendant became bankrupt. It was then discovered that the defendant had made over the land to his wife in charge of trustees, and they claimed everything on the ground in right of the wife. Upon that Messrs. Perry & Co. prosecuted him for obtaining the goods by false pretences, and the allegation was that he held himself out as the freeholder, and by that means he induced the prosecutors to part with their goods, which they would not have done if they had known that the freehold of the land was vested in the wife. Mr. Perry was examined in full, and his cross-examination reserved. Mr. Vernon, the architect, was partially examined, and the case was adjourned.

THE MYSTERIES OF FIGURES.

Sir,—I was in company, a little while ago, when some one present requested another to write down any amount in figures. Then he desired that all the figures should be added together, and afterwards subtracted from the original quantity. This being done, the propounder of the "trick" (as it was termed) requested that all the figures,—of the remainder, except one, should be called out, and on this being done he immediately added the missing digit.

This was very mysterious to all present, especially as the propounder could have had no knowledge whatever of the figures set down by the other. We were afterwards enlightened a little on being told that it was done by adding up the figures mentally as they were being called, and "casting the nines" out of the result.

It seems to be a fact then, that on the figures representing any amount being added together, and their sum subtracted from the amount itself, the remainder will always be found to contain a certain number of "nines" exactly.

An example will show this clearly. Take 7,982,147 to be the amount, the sum of these numerals is 38, which, deducted from the original quantity, leaves a remainder of 7,982,109 = 36 = 9. Suppose we omit the figure 8, then the rest add up to 28 = 10 = 1. The 1 being left out, the rest will equal 35 = 8. It will be plain then that 8 and 1 are severally required to complete the "nine."

Most people are acquainted with the fact of this peculiar property of the 9 in proving all sorts of calculations, and for my part I consider it has some deep significance in the construction of our numerical tables.

I have never yet met with one who could tell me the *whys* and the *wherefores* of it, but I hope now to get an explanation of it through the publicity of this communication in the *Builder*.

J. H.

STRENGTHENING EMBANKMENTS.

Sir,—The Editor's note to a letter by "E." in the *Builder* of the 20th ult., reminds me of what I saw in Egypt a fortnight since, viz., the fellahs at work repairing the embankments which retain the waters of the Nile for irrigation purposes by means of vegetable growths. I refer particularly to the embankment which leads across to the Sakkara Pyramids, which is about 15 ft. wide at the top, and the sides slope at an angle of about 45°. It was then about 7 ft. or 8 ft. above the water, and as it leads to the desert, of course it is only a camel and donkey track, and being formed apparently entirely of alluvial deposit, if not attended to, the water soon makes inroads into its banks, and slips occur. The repairs were being done chiefly by mud, rushes, and occasional stakes. The stumps of a layer of rushes were first laid against the bank; then mud was pressed against it, and secured by the stakes; then another layer of staked rushes, and sometimes of palm-branches. There is, no doubt, great strength in such work. It makes a firm embankment to resist the inroads of the water, and consequently it is with considerable difficulty the mud is washed out,—not until the stakes or rushes rot, or the rats burrow into the banks; for when the waters of the Nile rise, thousands of rats are driven to the higher level. This mode of repairing embankments must of necessity be of very great antiquity; for the desert and almost naked plains offer no other means for repairing them.

H. H. Bridgman.

THE CAUSE OF BAD WORK.

Sir,—I can endorse every word of "A Clerk of Works'" admirable letter in the *Builder* of December 4th, after forty years' experience in London and the provinces, and two years in the United States of America. A great deal of scamped work is due to the system of letting-off work. If architects were to specify in their contracts that the work should not be sublet, and that it should be done by experienced workmen, there would be less scamping done. Take plastering, for instance. I do not believe there is a building to be found where plaster and Keene's cement are not mixed. It is the same with Parian cement; and in plenty of instances where it is above the ground level of large buildings, colouring material is put into the water that putty and plaster are gauged with to imitate Keene's cement.

A great deal of the scamped work is owing to architects specifying that the work must be done by a given time, or else the builder is liable to heavy penalties. That is a wrong system if you want good buildings; in fact, the whole building trade wants the broom of reform applied to it, as well as other institutions.

It would be a good thing, Mr. Editor, if you could devote a little space of your valuable journal for the ventilation of this and kindred subjects, under the heading of "Trade Grievances," week after week. I believe it would bring about a better feeling between employer and employed.

M. A. S., Plasterer.

LONG SUCTION PIPES.

Sir,—I should be much obliged if any of your correspondents would inform me to what distances (giving total height to which the water is raised) long suction-pipes have been found available for shallow wells. I should like to know the diameter of the suction-pipe and the power required to work the pump, i.e., whether a child or woman using the ordinary lever-handle could overcome the friction; and I should be glad to know of any instances where a great length of suction has been found successful. What is the best practical work on hydraulic engineering, having especial regard to machines for raising water,—wheel, turbine, ram, &c.?

Surveyor.

The New General Post-Office, Manchester, which, according to the local press, has been much needed for the last twenty years, will, it is hoped, soon be commenced. It is stated that plans have already been prepared in the Office of Works.

CONCRETE IN PARLIAMENT-STREET.

Sir,—A letter in your paper of last Saturday, bearing the anonymous signature "Westminster," has misrepresented the composition of the concrete laid by this company in Parliament-street for the wood paving. As a fact, the concrete for the reception of the blocks was not, as represented in the letter, different in proportion from that used in covering the trenches, but of precisely the same proportion, viz., one to five.

The Portland cement was supplied by Messrs. White Brothers. The water poured on the concrete, and represented as "extremely dirty," was taken from the mains of the Chelsea Water Company, and is, therefore, I conclude, the water that the members of the Whitehall Club and the Institution of Civil Engineers have for drinking.

A. R. Grenfell,
Chairman of Improved Wood Pavement Company.

*** Our correspondent is a perfectly well-informed person on the subject, and we have no reason to doubt that he described correctly what he saw.

VARIORUM.

"Electric Light: Its Production and Use," by J. W. Urquhart, C.E.; edited by F. C. Webb, M.I.C.E. (Crosby Lockwood & Co.), gives plain directions for the working of batteries, lamps, and dynamo-electric machines. It may be recommended to those who wish to get clear ideas on the subject. The editor, to whom the book owes much, Mr. Frank Webb, will be agreeably remembered by many of our readers as a courteous official some years ago at the Royal Institute of British Architects. Mr. Webb is now connected with the Society of Telegraph Engineers, by whom his acquirements are duly appreciated. Mr. Urquhart's book is fully illustrated.——The new volume of the "British Almanac and Companion," now in its fifty-fourth year, presents a varied budget of articles in addition to the annual reviews of science, architecture, picture exhibitions, music, and metropolitan philanthropy, which have formed a marked improvement in its recent issues. The contents include:—"Weather Forecasting," by Robert H. Scott; "Sketch of the History of the Royal Observatory, Greenwich," by W. T. Lynn, B.A.; "Egypt in Liquidation," by J. Crowdy; "Proposed Ship Canal at Panama," and "Schemes for a Euphrates Railway," by G. Dodd; "Watchmaking by Machinery in England," by C. S. Murray; "The Food of the Poor," by W. E. A. Axon; "Parks, Gardens, and Open Spaces," by F. G. Heath; "London Hospitals and their Management," by the Editor (Mr. Charles Mackeson); "Bee Farming," by James F. Robinson. The Stationers' Company may fairly take credit for the contents of this useful volume.——The December part of "Cassell's Family Magazine" forms the commencement of a new volume, and affords the natural opportunity for new subscribers to commence taking it. Two interesting serial stories are commenced in it.

Miscellanea.

A Big Weathercock.—One of the largest linen-drapery establishments of Paris is constructing, near the Champ de Mars, where land is comparatively cheap, a vast building which will serve as coach-house and stables for the numerous horses and wagons belonging to the firm. There is nothing peculiar about these stables; the spirit of novelty and originality has manifested itself solely in the erection of a gigantic weathercock, which will be as remarkable in the artistic character and execution of its design as in its size. In height it will measure 26 ft., and its width no less than 13 ft. Nor will the design resemble that of ordinary weathercocks. It will consist of an heraldic lion rampant, holding up with its fore legs a gigantic initial; and the design of this monster has been entrusted to one of the most able heraldic engravers of Paris.

Proposed Infirmary for Kensington.—The Kensington guardians have decided on purchasing from the Vestry of St. Margaret and St. John the land adjoining the Kensington Infirmary and the buildings thereon, for 55,000*l.* The area is about 3¼ acres. The cost of adapting the premises, it is stated, will not be great.

A Mortuary for Kensington.—At a recent meeting of the Kensington Vestry, it was stated that the Guardians had refused to consent to a public mortuary being erected by the Vestry on their land at Notting-hill, and it was resolved to take steps for the purpose of constructing a mortuary in the parish churchyard, at the rear of the Town-hall, with the consent of the churchwardens.

The Love of Art the Love of Beauty.—On the occasion of distributing the prizes at the City School of Art, Skinner-street, Bishopsgate, Mr. Bryce, M.P., said,—"For those who lived by manual labour of the higher kinds nothing was more to be desired than that they should enjoy their work as an exercise of skill, calling out their faculties of invention and their dexterity of execution. The true spirit of the artist is the love of one's art, the desire to do work well for its own sake, and not merely because one is to be paid for it; and the more we can give to the artisan the character and feelings of the artist, the better and happier man he will be. There are many lines of life into which this kind of pleasure can hardly enter; but it is now absent from many others in which it might exist, and one of the chief services of art-schools is that they diffuse it, that they teach some workmen to design who could not have done so without training, while to a far larger number they give the power of appreciating and imitating or reproducing what is graceful and right, of feeling the harmony of colours and the elegance of form. And it was not only those directly occupied in production, workers in metal, or in earthenware, or in textile fabrics, to take the most important industries, who profited by a diffusion of knowledge of and taste for art, but through them the whole community. The true love of art, and not merely that love of fashion which often mistook itself for the love of art, was nothing less than the love of beauty. Material beauty, which came to us through the eyes, was of two kinds,—the beauty of Nature and the beauty of what man made for himself following or representing Nature. The latter was always accessible to us if we were trained to enjoy it, and, the more the taste for it is spread through the artisan class, so much the more rapidly would it leaven the whole population, and so much the commoner and easier to procure would artistic work become. We might just as well have beautiful things as ugly things before our eyes,—in our streets, hanging on our walls, standing on our breakfast-tables. Rich and rare they could not always be, but they need not be ugly; for plainness and simplicity are all the distance in the world from ugliness. The untrained eye may not always know the difference at first between a good wall-paper, for instance, and a bad one; but it soon gets to know, and the more it surrounds itself with pretty things the more it enjoys them.

Fogs and Mahogany.—After a paper on Fogs had been read at the Balloon Society the other night, Mr. W. H. Lefevre, C.E., the president of the society, said that he had conferred with Mr. Prim, the engineer of the Houses of Parliament. That gentleman said that the fog in the Houses of Parliament, which was occasionally found even when no fog existed outside, was due to the quantity of mahogany wood employed in the building. Mr. Lefevre gave an illustration of this phenomenon by lighting a cigarette and keeping the smoke over a table in the room. It was found that the smoke adhered to the surface of the table in a thin layer for about a minute. He claimed that, if a pipe was taken up to the top of Victoria Tower, the upper end would be above the fog, and that pure clear air could be brought down from that altitude for the ventilation of the House, and at the same time getting rid of the fog. Is it a fact that when London is in a fog the air is clear at the top of the Victoria Tower?

Artisans' Dwellings at Wolverhampton. At the Town-hall, Wolverhampton, on the 2nd inst., a county jury was sworn before Mr. M. F. Blakiston, the acting under-sheriff of the county of Stafford, to decide an appeal made by Messrs. Lowe & Jones, owners and mortgagees of property situate at Stafford and at Wolverhampton, and required by the corporation under the Artisans' Dwellings and Streets Improvement Scheme, against the award of Sir Henry Arthur Hunt, C.B., the arbitrator under the scheme, who assessed the compensation to be paid to the owners at 2,300*l*. After hearing evidence on both sides, the jury awarded the claimants a total sum of 2,600*l*., with costs against the corporation.

Proposed Memorial to Caxton.—It is proposed to erect a memorial to William Caxton, England's first printer, in the shape of a stained-glass window in the church of St. Margaret, Westminster. A committee has been formed to carry out the object, with the Rev. Canon Farrar as chairman, Mr. G. A. Spottiswoode as treasurer, and Mr. A. Powell as secretary.

Overcrowding at Plymouth.—At a meeting of the Plymouth Mercantile Association last week, Mr. Pethick opened a discussion on the subject of providing improved dwellings for the poor. He adduced instances of shameful overcrowding, saying that in some instances eight or ten persons were living in one room, and in the case of the miserable hovels in which this state of things existed there was only one water-closet for the use of eight or ten families. Alderman Derry, who presided, referred to Mr. Cross's Artisans' Dwellings Act as unworkable, and added, "My own feeling is that we shall do nothing in this town until we get a special Act of Parliament. The state of things existing now in Looe-street, in this town, is most deplorable. There is one house at the bottom of Looe-street which contains sixty persons, with a water-closet 5 ft. 7 in. square, and all the persons in the house are obliged to go to that closet." (Mr. Pethick: 2 ft. broad and 5 ft. long.) The opinion was strongly expressed that the Sanitary Authority had not been doing its duty, and a resolution was passed directing the attention of the Town Council to the matter. Mr. Square, in the course of the discussion, referred to the financial difficulty involved in the asserted inability to erect workmen's dwellings to pay more than 3 or 4 per cent. Mr. Pethick (who is, if we mistake not, a well-known builder and contractor carrying on business in the town), in reply to that point, said,—"I may mention that I have two houses containing twenty-eight rooms, for which I receive 24*s*.,—less than 1*s*. a room,—and I say that others can be built inexpensively and substantially, and with due requirements, that may let in the same way and return 5 per cent.; and the rooms may be as they should be,—from 12 ft. to 14 ft. square, and not less than 9 ft. high." Quickly following on this discussion, a company has been formed in the town to erect dwellings for the poor. It should be added that the *Western Daily Mercury* has done good service in directing public attention to the matter.

Civil and Mechanical Engineers' Society. The opening meeting of this Society for Session 1880–81 was held on Thursday evening last in the Society's new rooms at 7, Westminster-chambers, when the President (Mr. H. Ellis Hill, A.-M.I.C.E.) delivered an inaugural address. The following is the syllabus of papers to be read during the session,—Dec. 23, "The Patent Laws and their Influence on Trade," by Mr. A. T. Walmisley; Jan. 6, 1881, "Account of Sombrero Island, West Indies, with description of submarine quarrying of phosphate of lime," by Mr. R. Harkness Twigg; Jan. 20, "Application of Hydraulic Machinery to Mines, Gasworks, Grain Warehouses, &c.," by Mr. J. Coates; Feb. 3, "Drainage and Embanking, with regard to River Outfalls," by Mr. W. C. Street; Feb. 17, "Water-bearing Strata of the Thames Basin," by Mr. A. F. E. Grant; March 3, "Steep Gradients *versus* Heavy Works," by Mr. J. B. Walton; March 17, "House Drainage and Sewerage," by Mr. R. E. Middleton; March 31, "Lifts for Warehouses, &c.," by Mr. G. J. Child; April 7, "Rainfall," by Mr. B. Haughton; April 21, "Drainage of North Lincolnshire," by Mr. J. Henry Maughan. The annual meeting is fixed for May 5. Mr. G. A. Pryce Cuxson (of the firm of Maughan & Cuxson) has just taken the honorary secretaryship of the Society, which, we may add, has now been established twenty years.

St. Edmund the King and Martyr and St. Nicholas Acons, Lombard-street.—The extensive alterations and improvements that have been in progress in this church for some months past, under the superintendence of Mr. Butterfield, are now being rapidly completed, and the church will be re-opened for divine service on Christmas Eve. In addition to the repairs and decoration of the fabric, the organ is being greatly enlarged, and many modern improvements added to it, under the supervision of Professor Monk, of King's College.—*City Press.*

The Vacant District Surveyorship.—As usual when a vacancy occurs, there is a plethora of candidates for the office of district surveyor of Streatham and Brixton, rendered vacant by the death of Mr. John Mullins, the late surveyor. The number of candidates in the field is between twenty and thirty, including several Associates of the Royal Institute of British Architects. Mr. J. S. Quilter, the late deputy-surveyor, who is also one of the candidates, states in his address that, during the last three years, he has acted in that capacity.

London Fogs.—Mr. W. H. White, of the Institute of Architects, writes:—May I venture to inquire whether those lungs of the metropolis, the parks, may not, in some degree, be responsible for the fogs which periodically obscure parts of London? The fog of Thursday last is known to have prevailed principally in the northern, north-western, and western districts; at the termini of the North-Western and Midland Railways great inconvenience was felt. Now, on the afternoon of that day,—at about half-past four,—I passed through the Regent's Park, and there I observed over a vast space,—the circumference of which, I believe, is three miles,—a dense mass of bluish vapour rising apparently from the grass. In the midst of this vapour, a feeling of damp cold was experienced, with a tendency to cough, while beard and moustache were covered with globules of water. Objects at a few yards' distance could not be distinguished; both in the Euston-road and at Gloucester-gate the enclosure walls of different houses streamed with moisture. At a later hour,—at 11.30 p.m.,—I was in Portland-place, where foot-passengers clung to the area-railings as the only means available for directing their steps. Arrived, however, at Oxford-circus, the fog was less dense; at the eastern end of Oxford-street comparatively little existed. I traversed the slums of Soho, Covent-garden, and the Strand without any difficulty, and the city was free from fog. I would, therefore, humbly beg scientific men who are interested in this matter to visit the Regent's Park any day this winter between 4 and 5 p.m. I have been told that the drainage there is of an obsolete character, and from my experience of this and last year, when London has been visited with fog, the cloud has seemed to me to be thicker in Portland-place than in Oxford-street, or even the Strand.

Adulteration of Food in America.—Through the efforts of *The Sanitary Engineer*, the National Board of Trade, at their annual meeting in Washington last December, were induced to institute a competition for "the best Act or Acts, accompanied by an essay, designed to prevent injurious adulteration, and to regulate the sale of food, without imposing unnecessary burdens upon commerce." One thousand dollars were offered in prizes, which sum had been given to the Board for that purpose by Mr. F. B. Thurber, of New York. The committee of award have just made their report. In addition to awarding the prizes, the committee were required to prepare and submit to the Board of Trade a draft of a suitable National and State Bill designed to secure the results which the competition was instituted to accomplish. The committee have selected as the three most meritorious essays, with the accompanying Acts, numbering them consecutively in the order of merit as follows:—

1. The essay and acts having the motto "Aequo Animo."
2. The essay and acts having the motto "Sic utere tuo ut alienum non laedas."
3. The essay and acts having the motto "Overcome Evil with Good."

Upon opening the sealed envelopes, having corresponding mottoes, it is found that the authors of these essays are as follows, viz.:—

1. Motto "Aequo Animo," G. W. Wigner, F.C.S., London.
2. Motto "Sic u'ere tuo ut alienum non laedas," Vernon M. Davis, New York City, N.Y.
3. Motto "Overcome Evil with Good," William H. Newell, M.D., Jersey City Heights, New Jersey.

In addition to these essays, we recommend the printing of the essay having the motto "Cardinal Cajetan," whose author is O. W. Wight, M.D., Health Officer, Milwaukee, Wisconsin; and the remarks submitted under the motto "Work and Wait," by Albert B. Prescott, Ann Arbor, Michigan.

New Docks for Silloth.—It is stated to be the intention of the North British Railway Company to build a new dock at Silloth. A few days ago Mr. Thomas Meik, C.E., of Edinburgh, visited Silloth, in company with Mr. Charles Boyd, resident engineer to the company, for the purpose of reporting upon the proposed work. It is added that the new dock is to be about six acres in extent.

Measuring Tapes.—We have received several letters recommending this or that maker's tape; but these are all known to "Inquirer," and are fallible. We have not yet received a letter from any maker promising to try and do better. The want of thoroughly reliable and lasting tapes is admitted.

Light, Heat, and Ventilation.—An exhibition is announced of appliances for heating, lighting, and ventilation. It is to held at the Alexandra Palace, in the great central transept and adjoining halls, and will be opened from December 22nd to January 11th.

TENDERS

For the erection of two villa residences, Woodhouse-road, Mansfield, for Mr. G. Pickard. Mr. Thomas Hartas, architect. Quantities supplied:—

Fisher, Bros., Mansfield	£1,650	0	0
Roe, Alfreton	1,634	9	0
Alsop, Mansfield	1,602	11	6
Parsons, Mansfield	1,595	0	0
Vallance, Mansfield	1,595	0	0
Tinkler, Clay-cross	1,517	0	0
Bradder, Mansfield	1,448	0	0
Bell & Son, Nottingham	1,442	0	0
Maben & Fairington, Manchester	1,400	0	0
Greenwood, Mansfield (accepted)	1,323	0	0

For completing the Alexandra Mansions, Victoria-street, Westminster, for the Midland Land and Investment Corporation, Limited. Messrs. Bateman & Corser, architects:—

Francis	£18,230	0	0
Avins & Co.	17,647	0	0
Lathey Bros.	16,623	0	0
Colls & Sons	15,991	0	0
Martin & Co.	15,628	0	0
Longmire & Burge	15,332	0	0
Adamson & Son	14,400	0	0
Patrick & Son	14,317	0	0

For sanitary works, Cornhill. Mr. T. Mullett Ellis, architect:—

Beattie, Holden-terrace	£155	0	0

For decorative work, No. 3, Warwick-square, Pimlico, for Mr. Francis Mowatt. Mr. T. M. Ellis, architect:—
Wilson, Sussex-street (accepted).

For building two houses and shops, Mile End-road, and altering stable premises adjoining. Mr. T. M. Ellis, architect:—

Hart (accepted)	£3,180	0	0

For two houses, Hampstead-heath. Mr. J. Milbourn, architect:—

Linsell	£2,100	0	0
Harper	2,090	0	0
Conder	1,960	0	0
Bishop	1,910	0	0
Cross	1,855	0	0
Ambley	1,815	0	0
Read	1,598	15	0

For alterations and repairs to houses, Stroud-green-road, for Mr. Earl. Mr. W. Smith, architect:—

Shurmur	£840	0	0
Steel Bros.	825	0	0
Harper	725	0	0
Larke	685	0	0
Mattock Bros.	595	0	0
Dunford & Langham	595	0	0
Stevens Bros.	538	0	0

For erecting villa residence, stables and fencing, at Winchmore-hill, for Mr. Sugden. Mr. W. Smith, architect:—

Steel Bros.	£2,093	0	0
Larke	1,990	0	0
Shurmur	1,950	0	0
Harper	1,939	0	0
Dunford & Langham	1,929	0	0
Pocock	1,765	0	0
Mattock Bros.	1,477	0	0
Wheeler	1,420	0	0

For the erection of greenhouse and pits in Venner-road, Sydenham. Mr. C. J. C. Pawley, architect:—

Hollidge & Stuart,* South Norwood	£270	0	0

* Accepted.

For the construction of sewers on the Aldrington Estate, near Brighton. Mr. Arthur Lewis, engineer. Quantities supplied:—

	Concrete.	Combined Brick and Concrete.
Crockett, London	(add) £250	£3,545
Oliver, Preston Park	3,371	3,371
Parsons & Sons, Hove	3,370	3,340
Marshall, Brighton	3,089	3,059
North, Hove	2,524	3,298
Hurst, Aldrington	2,950	3,020
Blaker,* Portslade	(add) 528	2,978
Harrison,† Brighton	2,680	2,990

* Too late. † Accepted for brick and concrete.

For additions and alterations at 29, Gower-street. Mr. Thomas Newell, architect:—

Bush	£652	0	0
Perkins	650	0	0

For new schools at Glascoed, Monmouthshire, for the Llanbadoc, Monkswood, and Glascoed U. D. School Board. Mr. E. A. Lansdowne, architect, Newport, Monmouthshire:—

White, Abergavenny	£884	0	0
Davis & Jones, Newport	876	0	0
Davis & Johnson, Pontypool	844	0	0
Hatherley, Bristol	798	0	0
Linton, Newport	793	0	0
Thomas, Abergavenny	770	0	0
James & Son, Bridgend	700	0	0
Howard, Cardiff	693	0	0
Jones & Dimont, Newport	690	0	0
Richards, Newport	684	0	0
Blackburne, Newport	649	0	0
Orphan, Newport	645	0	0
Davis, Usk	620	0	0
Burgoyne, Blaenavon	610	0	0
Jones & Son, Newport	629	10	0
Martin, Newport	600	0	0
Moulton & Brownscombe, Newport	585	0	0
Giles, Ewens Harold	578	0	0

For the new brewery buildings of ten quarters capacity for Mr. J. Elworthy, Kettering, from drawings and specifications. Mr. Arthur Kinder, architect:—

Margets	£940	0	0
Henson	927	0	0
Sharman	915	0	0
Barlow (accepted)	850	0	0

TO CORRESPONDENTS.

J. S. M. (shall have attention).—M. S. A. W. (we have already published the selected design) —M. A. S.—H. I. B.—W. C. T.—G. A. P.—C. G. B.—T. & P.—"Queen Anne."—A. L.—T. G.—W. B.—R. S.—J. & W.—B. & C.—J. M. C.—C. G. D.—R. S. & Co.—J. P.—J. & C. M.—J. H.—F. C. & Sons.—J. P.—R. & C.—C. T.—J. D.—T. M. E.—R. & C.—J. McG.—E. A. L.—G. T. C.—A. H.—T. R. S.—O. P.

Errata.—In the letter headed "Noises" (p. 679), the figure 44° should have been printed thus: –44° (*minus*, or 44 degrees below zero).—In the abstract of Mr. Robins's paper on "Sanitary Science," &c., printed on p. 696, the third principle summarised by Mr. Griffith should read,—"The soil-pipe should be fixed *outside* the house," &c.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

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Christmas Week.—*The* BUILDER *for the week ending December 25th will be published on* **Thursday, 23rd** *inst., at the usual hour.*

Advertisements for insertion in that issue must therefore reach the Office before Three o'clock P.M. *on* **Wednesday, 22nd** *inst.*

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